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Editorial

A healthy body and mind

According to the definition of health by World Health Organisation, good health is a well-maintained sound body and mind. Now, there are some specific directives in the medical science on how a healthy body can be developed and maintained, but nothing regarding the growth and upkeep of a healthy mind. Then how can we know about that? As the branch of medicine that deals with the mind *i.e.* psychiatry, does not say anything specifically on this issue.

Then the question is, does psychiatry deal with an impaired mind only? Isn't there any instruction or discussion in this stream about how a person should keep up the health & growth of his mind? Of course it is true, that till date psychiatry has flourished through the study of the abnormal mind. And the demand for a healthy mind as well as a sound body has been growing since around the 70's. As a matter of fact, even a few years back this subject was studied by the scholars of Theology and Philosophy. The study of the mind was never a part of science or medical science for that matter.

However, during the study it has become clear that opining about the method of construction and development of a healthy and normal mind is quite a complicated and difficult job. As compared to our body, our mind is a thousand times more closely related to the Natural and social environment around us. So it's astonishing that our knowledge about the mind is still nothing compared to what we have learnt about the nuclear fission. One of the reasons behind this is certainly the inclusion of the abnormal mind or psychiatric diseases in the medical science after a long and tough battle. On the contrary, the development of a normal mind is still under the curriculum of Education department. If the diseased body is a model for pathology, at present the diseased mind is the model of a poor, faulty, education and negative learning. Moreover, these two have more differences than similarities regarding the maintenance of the mental health as compared to the physical health.

As for example, we have a notion of what a good physical health is - where a person will be tall, healthy and muscular if he is a man and must be charming if she is a woman. He will be able to toil promptly for long hours. The blood level of organic matters (*i.e.* carbohydrate, protein and fat) produced during metabolism in his body will be reasonably low, low blood pressure, there will be no excess fat in his body or no symptom of any disease will be evident. Moreover, it will be observed that these abilities will reduce with the increasing age. So physical health is considered as a category or as a complete classification of diverse virtues each consisting of the same attributes. And the mental health is the trait *i.e.* special signs, symptoms or indicating specialities of character, nature, appearance, behaviour etc.. Moreover nobody interferes in the matters of physical health except during the ailments.

But this shouldn't happen in case of mental health. Here a person is always encouraged and inspired to develop his health *e.g.* more intelligence, patience, calmness, tolerance, less anger and a more flexible and easy going mood is better; compassion towards others is even better. And the best is, if one doesn't become a selfish and self-centred lot, but can selflessly work for others. Moreover these qualities should grow with one's age. That's why the mental ability of a 70 year old (*e.g.* a 70 year old honourable Judge of the Supreme Court) is far more mature than that of a man in his 20's (*e.g.* a Kargil warrior). If we look beyond, it becomes

evident that there are enough differences in the indigenous works and ethos of every culture on this matter. It is quite similar to that of a certain person's routine being considered as a compulsory characteristic of a particular lifestyle, but that getting no importance at all in another mode of lifestyle.

Moreover, an idea about the complications of an abnormal state of the body and mind is formed depending on the degree of importance one attaches to a subject. E.g. Let's suppose that a boy is suffering mentally and physically, lying in the bed due to his broken leg a few months prior to the Higher Secondary Examination. On the other hand, there is this guy who has his parents suffering from Diabetes. So he is sacred to lead a normal life since his early years itself. If compared, who is more sick between these two? Again during any battle whatever wrong one does, he can not get appreciated if he proceeds slowly and steadily; rather he will be humiliated. This is because one should instantly take action with a strong mental preparation during any catastrophic emergency. In that case, people having that kind of promptness are honoured the most.

One may ask what for all these are - 1. To gather and to adapt with and finally consume the ingredients obtained from this society; 2. To make arrangements in order to lead a more consumeristic life for oneself and one's family; 3. To always remain creative; 4. To contribute to various social activities. Considering the above anybody can surely tell that, I would not come to see what remains or not after my death. So, why should I cause a headache thinking about the future? I will try so that I can live this life with utmost pleasure.

One may be bemused to think about all these - about what the better and the best of a normal mind should be. Then we have to think whether a model for that could possibly be made. It will be possible only if the traditional and universally accepted merits and demerits of the apparently normal people from every society in the world are, adjudged and algorithmed.

P A S

Psychiatrist Dhirendranath

(Continued article - 7th part)

Basu Dev Mukherjee

[We consider Dhirendranath as one of the leading pioneers of psychiatry in India. In the previous issues of this magazine we had included the intellectual formation and socio-psychological development of Dhirendranath as a psychiatrist. He had many introductions but over all other introductions, being a psychiatrist can claim to one of the fundamental ones. We will examine the matter further in this issue regarding his achievement as a psychiatrist in practice due to wholistic participation in the subject. Ed. PAS.]

Schizophrenia

It perhaps would not be an over-statement, if it is said that, in history, the commencement of the familiarity with the psychiatric illness happened with this disease. Since very early times of the civilization, we get the news of this disease from different culture and societies. Hence it can be understood that, this disease is almost as old as the civilization itself. It can not be found among the animals, so it can be said that, it is only a disease of the *Homo sapiens*. The psychiatrists have become educated throughout the ages with the help of this disease. It is doubtful, whether a psychiatrist, who has never changed his opinion about schizophrenia quite a few times in his professional life, could be found. Naturally, Dhirendranath too had his own opinion about it and he admitted that, he didn't see those types of the disease now, which

he used to, at the beginning of his profession.

Like other psychiatrists, he too had become trained through the demonstration of this disease. His mind used to fill up with dejection, whenever he saw a new schizophrenia patient specially if he or she was a young chap. He tried to deeply realize, how in this disease man's best qualities or abilities like thinking, perception, emotion, volition, working capacity of the highest level etc. get disorderly. Because there is not a single comprehensive disease of this kind in human beings other than it. This disease exhausts not only a person from all aspects but also his family and they have to face a socially difficult situation. And this is not a problem only in our country or society. This disease is equally present all over the world, in every civilization and culture.

In this context it can be mentioned that, we made a primary observation on two different population of this state at two different times to search for psychiatric diseases on the behalf of our institution. These two places were Suti, Block no. I in Murshidabad district during 1982-1987 on one lakh population and Khanakul, Block no. I in Hooghly district during 1987-1988 on sixty thousand population. In both the cases we obtained for fewer schizophrenia patients almost at the rate of one in every thousand. In comparison, we got much more mentally retarded patients. However, at different times during our own discussions we used to point at certain reasons of the following factors that cause schizophrenia, e.g. 1. biological causes (genetic or immunological), 2. dangerous insult during the foetal state, at the time of parturation or at the growth and development period after birth, 3. due to the interaction between the mood and the personality of the person with socioeconomic culture of family environment, 4. social oppression etc..

The anti-psychiatry movement throughout the globe started surrounding this disease where a leader like Thomas Szasz commented keeping it in his mind "... a sane reaction to an insane world." Dhirendranath had closely observed this movement and had written many articles regarding this subject in *Manobmon*. Moreover, from the time of starting his newspaper i.e. from around 1960, he had appealed for providing various social opportunities and conveniences to schizophrenia patients regarding them or their chronic state as mentally handicapped.

Pavlov has said something about this disease, which we come to know from his writings. Needless to say that Dhirendranath, at the beginning of his works, was quite influenced by Pavlov's those writings. But at later times, his opinions started changing and he had maintained different views on this issue at different times. Hence we think that, he had changed his views at different times, gradually seeing his patients. But in certain issues, he didn't change his opinion, E.g. the main investigable issue about the schizophrenia patients, according to him was, to what extent the patient has a disordered personality or how retarded he is and how for active he could be kept. However, he used to eagerly read down the writings about this disease in the newest editions of the text books and he also loved to argue with us on this issue. But he always used to try to prove one thing before us that, the entire brain gets disrupted in the disease specially the disbalancement, dysequilibrium or disinhibition of the excitatory-inhibitory process of the nervous system, which is the postulation of Pavlov.

We however tried to find out the specific places of the brain to settle the issue of our diagnosis and treatment; but he didn't want to accept that. Again the problem is that, this disease too is of such an all pervasive nature that it became almost impossible to particularly define it. According to Pavlov's theory, various structural and functional disorder in the brain takes place in this disease. Dhirendranath too had this kind of opinion. But normally he didn't put every schizophrenia under the same severity or category.

He had his own style or method of treatment of this disease. He also used to say that,

homeostasis of the whole body gets disorderly when a disease attacks it. Then our duty is to give a start to the positive feedback *i.e.* carry on the positive physiological order, resisting that negative wheel with the minimum possible medicine. When told about the medicines he used to say with much self-confidence that, how much medicine could act going inside the huge liquid room of the brain or the spinal cord and that too how specifically and in exact site! I can remember an incident related to such application of medicines.

Dopamine hypothesis is well-known in the making of schizophrenia. Once a patient having less acute schizophrenia and on small amount of antipsychotic drugs complained of incapacitated tremor of his hands. That gentleman used to teach mathematics in a college, so it was causing difficulty for him to write on the black-board in the class. He was repeatedly requesting the physician to do something for that. So I, getting over enthusiastic, suggested to give him a medicine classified under dopamine (syndopa) to lessen this tremor of his hands. But Dhirendranath in this case was biased towards giving anticholinergic drugs (comparatively less stronger). However, as a result it was noticed that the gentleman's psychiatry problem severely increased having taken the dopamine type of medicine.

Then Dhirendranath got a wider opportunity of proving his point. He tried to make me understand that this disease happens due to the dysequilibrium of the excitation-inhibition system of the brain of not only sympathomimetic amines but also due to imbalance of the different types of neurotransmitters. This disease can occur equally in both the cases due to excess or deficiency of this bioactive molecules. So, applying the medicines arbitrarily and randomly, though we were being able to reduce the patient's suffering to a certain extent for the time being (proximate value), eventually the patient was incurring loss permanently (ultimate value). Because, examining the brains of the schizophrenics after their death, who had been taking medicines for long, it was noticed that their brains had undergone an enormous change as a result of taking these medicines. Moreover, he didn't want to accept the conventional idea about the neurotransmitters. His conception was that, certain biochemical matters under certain circumstances transform into the neurotransmitters and play that role and its predominance or sensitivity express as the brain type of the person.

If we judge thus it will be evident that, as if Dhirendranath had an idea that there were schizophrenics of different magnitude among our psychiatry patients. When their disease shows up or remains within a small limit, 1. the importance of perceptual disorder (hallucination-delusion) prevails, later when the disease grows in full form, 2. the patient gets mentally disorganised or eventually 3. arrives with negative signs and symptoms. He used to mostly think about these three classes of schizophrenia. But I have generally seen that he wanted to judge all mental ailments from the point of view of a discontinued process (continuum). That is, when the disease takes a serious condition; the patient get highly disturbed and when it becomes smaller he is seized by diminutive psychiatric problem.

He used to keep under consideration, whether there was any genetic overloading of any sort of psychiatry diseases in the family, whether the person had obtained proper nutrition while growing up since conception, to what extent his surroundings was conducive of this disease, how strong or weak he was in his brain type (excitatory-inhibitory process) etc., to explain whose disease would reach what dimensions. He had to get into confusion only to solve the contradiction of the warp and woof between the emotional intelligence and cognitive process. Among the big ailments, it could be seen with a certainty that some were suffering from an impulsive disorder and some from the disorder of the cognitive process. In order to solve this conflict, in many cases he used the Pavlovian brain type as a way out.

Likewise, he also used to judge where the consequence of this disease would reach, with the indicatives of the following types: e.g. his pre-morbid personality formation, how the

disease started, the course of the disease process, what the chronic state of the disease was etc.. In this premorbid mental state, laid the pattern of the growth and development of the major aspects of the patient's personality before the disease. It became evident that, 25-50% patients had disorder in this matter. E.g. withdrawn oneself, introvert nature, poor result in the school and college exams, incompetence in the construction or maintenance of inter-human relationship, disability to do the social activities that well, incapability of responding in the matters of emotions and impulses as required, always suspect that somebody would harm him, do something all of a sudden becoming impulsive, inability of understanding when he would behave in what manner etc.. It became easier for us to recognize the disease with certainty, if the patient had these specific signs and symptoms.

Then come the issue of the onset of the disease. How the disease started. Generally here schizophrenia starts very quickly. Comparatively, this disease starts very slowly and its consequence becomes far more dangerous in many cases abroad. Moreover it was also evident that, the less negative signs and symptoms had been there in the beginning of this disease, the more the development in the patient's treatment was noticed. After the initiation of the disease, the patient seeks treatment or spends some days wearing amulets, rings etc.. The first five to seven years of the patients are spent too badly indeed. During this time many ups and downs in the disease occur, the consequence of the disease cannot be understood at all, various side effects appear during the treatment. So, the homemates of the patient perhaps keep on changing only the physician. In these cases the responsibility of the family increases impossibly. Though our family or society is much more community-centered, now due to the breakage of the joint family, in small families, the family eventually appears to break when the young boy or girl suffers from psychiatry diseases. In this context one must say that, the earlier the disease is detected and properly treated, the more the patient is benefited. Here the family has quite a big role to play. However, the patient reaches a stagnant situation seven to ten years after the commencement of the treatment. Because the patient then grows in age and his family fighting along with him, understands what minimum assistance he should be given. In this way, a familial and social position of the patient is prepared.

It has been noticed that the issue of the patient's future rehabilitation gets hard and complicated as the treatment gets delayed. In such cases the family or any particular member of the family has to take the responsibility. Though a suitable time or the patient's growing up passes by when remaining diseased and what goes by does not come back again, in most of the cases one has to think or actively help the patient enough in the matter of appointing him in the work, considering how much efficiency he has after getting well. In this matter the parents face even more difficulty with the girls. Some invite fierce danger by marrying of their daughters concealing the disease. But generally it has been seen that the women have much less danger in this disease than the men. Because most of them don't have to work getting outside of their house and they can spend the rest of their lives within the small boundary of the worldly chores.

No psychiatrist can tell that he has a model for the treatment of schizophrenia! Every psychiatrist gets himself with the treatment of his disease. Every psychiatrist knows that almost nothing could be done for some patients. Their condition will deteriorate with the passing of the days. Still the situation has become much better now. The percentage of this highly disorganised segment was much higher before the arrival of different medicines in the market. Moreover in our under-developed society even now this type of patients get humane treatment. An example of this can be given. In our families, this type of many men or women can be found who has spent or is spending their entire life with schizophrenic patients.

But in these types of diseases generally the disorder of the cognitive process (mental

retardation) and flattening of affect, provoked Dhirendranath's thoughts the most. Thinking all these, in case of any patient he used to repeatedly investigate whether he had the 'schizophrenic core'. By this term what he tried to express was perhaps a combined form of that disorder of the cognitive and affective process. Naturally he used to lose his heart, the more he saw the disorganised state of the patient's personality. Likewise, he used to get depressed, the more he viewed the negative signs and symptoms of the disease. In case of these diseases he used to consider the issue of getting any effective help from the family as more important. So, from the start of the treatment, he used to become a family friend of every patient of this type, within a few days.

Thinking about the future he used to say, "Our life has been spent understanding these things. You would probably see much better times. The awareness about this disease among the people would generally increase even further. There will be no stigma, the people in the family and in the society would think about them with more compassion. More specific medicines would be invented. A model of psychotherapy would be made. A huge number of people would think about them, so a better clinical care could be given. A far better arrangement could be made in case of saving their Human Rights." But in this context I should say that, he used to most poorly regard the schizophrenia among the children.

Dhirendranath used to say, "Schizophrenia can be instantly recognised, our mind is governed by the whole brain i.e. there are a few neural substrates to direct it." So, he used to continuously algorithm how much disorder had devoured the following parts of the brain in case of his patients, being certain about the fact that structural and functional disorder do happen in the brain in this disease. It was evident that as per his opinion, the following parts of extended area of the brain comes under the grip of disorder in this disease.

1. Dysequilibrium of the pathway of basal ganglia: Here the process of all our voluntary and involuntary movements is integrated and the density of the neurotransmitter like dopamine is the highest in this place. As a result, all kinds of voluntary activities of the patient get hampered due to the dysequilibrium of this path.
2. Disorder of the thalamus: all the sensations enter the cerebrum after getting filtered through this area. So it can be called the gateway of all sensations. So the patient's sensory excitement is abnormally affected due to the disorder of this part.
3. Disorder of frontal lobe connections: we can serially and permanently witness the negative signs and symptoms of this disease due to it. In addition the ability of 'executive functions' of the highest level also disappears in this case.
4. Disorder in the temporolimbic system : Hallucination, delusion, amnesia, the dearth of the ability to understand or learn anything orderly etc. can be observed due to it.
5. disorder of the left cerebrum: The left cerebrum is responsible for all of our verbal language activities, because generally (in 90% of the cases) the language motor and sensory centres lies at the left cerebrum. In this disease the verbal activities are terribly disrupted and the entire logical and judgemental consideration built within the patient gets damaged. So it can be assumed that the left cerebrum is attacked more in this disease.

It should be remembered that, the scope of examining the patient in the laboratory was almost non-existent, when Dhirendranath used to work on these subjects. As a result, he used to try to match the patient's nature or his altered nature with the Pavlovian brain type in addition to specifying the theory of the abnormal condition of these psychiatric diseases. Thereafter during the post-treatment period he used to think what result psychotherapy and the medicines had, in the treatment in case of the follow-ups. But there is no doubt that all his efforts were clinical.

Psychosomatic diseases

We have to definitely mention about the psychosomatic diseases, if Dhirendranath could be called a master in any one section of psychiatry. We don't know, whether any psychiatrist could have cured this disease as excellently as he did. I had seen several times that a certain executive had extensively frequented almost all of the big medical institutions in India, perhaps for a year or so, to reduce the pain in his epigastric region i.e. the peptic ulcer syndrome. In this connection, myriad papers related to the diagnosis of the disease had been piled up in the patient's laboratory. But his disease got no alleviation. At last, his entire disease was cured after coming to him and taking a little anxiolytic medicine and suggestion-therapy. He used to say, "It is a classical psychosocial approach of medical care, intimately related with the scientific research of Pavlov. Crores and crores of people are getting an immediate result of Pavlov's constant endeavour in his research, through this method of treatment." He wished to do many things about this disease. E.g. he wanted to train the primary care physician (G.P.) in this subject. For this purpose an agenda was advertised in *Manabmon* quite a number of times; but eventually nothing served the purpose.

In the beginning, he used to object at the term psychosomatic and wanted to use the term 'cortico-visceral' as coined by Pavlov's student Bykov. Because the term psychosomatic as if reminds of the Cartesian parallelism or dualism between the body and the mind. However, eventually the term 'psychosomatic' remained in practice, because we failed to make others understand the situation of this disease using any other alternative better term. As a reaction of this, it was noticed that the specialists in other departments of the medical institution were misinterpreting the term. Having failed to solve such problems, they used to talk with their colleagues in this matter or teach the students, using terms such as 'psycho' etc.; but wanted to make them understand that these are something like malingering or feigning illness etc..

Later on it became evident that the psychosomatic diseases had been able to conquer the entire medical science because the specialists in different departments realized and admitted what has been written in the foreign text books that, the mind has its specific effect on the diseases happening to the body. They were compelled to admit in their talks and discussions that, no permanent solution could be found in case of this disease, if the issue of the relationship between the mind and the physical ailments is not properly managed. So now in their prescriptions, arbitrary use of the tension-reducing medicines like alprazolam would be available. They admitted that anxiety tension has an important role in chronic diseases such as diabetes, hypertension, arthritis etc.. They noticed that diseases like heart attack is not abated if there is depression. They also noticed that anxiety tension has a definite role in diseases viz. rheumatoid arthritis, bronchial asthma etc..

In this context let me tell you about two incidents which I had seen to happen in front of my eyes. Perhaps quite a number of psychiatrists have had such an experience. A sixteen or seventeen years old girl was suddenly being unable to see with her eyes. Everyone held and brought her. On seeing her Dhirendranath instantly understood that she had hysterical blindness. So he gave her suggestions for a long time. The girl became able to walk out of the room on her own after hearing the suggestion. Once again a middle-aged man, who had illness due to asthma, was speaking of to Dhirendranath something like, " ... There was nobody in the room, I was then having tremendous asthmatic spasms, suddenly I got the news that my younger grandson had broken his hand out of a fall. Then my illness apparently vanished! I somehow ran fast with my grandson. I returned home after doing the X-ray and plaster from the hospital. What can I say to you Doctor, the thought which came to my mind sometime back that I would perhaps no longer live due to asthma, did not bother me even for once during

the five or six hours I was busy with my grandson!"

It's true that, this type of disease does not happen to everybody in the same manner i.e. the stress of the environment does not affect all equally. So, we have to think that, when this disease occurs, it must be the case that the person has any kind of genetic (structural) and / or functional vulnerability in his brain. In this case, the classification of the Pavlovian brain type comes across as extremely important, due to which a certain person under the socio-economic upbringing, develops a personality type by continuous internalization - externalization process in various determined and contingent situation. But we cannot predict who would succumb to the specific situation. Certainly the person struggle to get rid of the grip of the disease at the very beginning. He tries to prevent the disease in various ways with his own adjustment capacity; but when he cannot keep anymore, he takes refuge in such psychosomatic signs and symptoms. In the context of this disease a universally accepted theory is 'stress theory'.

The funny thing is that, psychologist Walter Cannon (1927) proposed this theory from Pavlov's physiological research. The main substantial part of it was obtained from physics, where it is said that, when a matter is kept under stress, it will try to apt with that stress before breaking down. Eventually, when it would not be able to bear further, it will break. So it was supposed that, perhaps in case of animals also exactly this type of phenomena occur. Physiologist Baymont on close examination of the egression tract of a patient's stomach showed that when the patient gets stimulated with impulses, his stomach effuses juices at a large amount and when he remains depressed, his stomach does not effuse juices at all. We were astonished to see that this type of experiments concerning the quantitative and qualitative effusion of the digestive fluid in the stomach of the animals, had been done in a generous amount in Pavlov's laboratory, yet at modern times the western scientists are not giving that recognition to Pavlov's contribution in the history of psychosomatic diseases.

In this context here we can put up a historical figure-line of the origin and development of psychosomatic diseases.

1. 10,000 B.C. ago it was perceived that we suffer from diseases due to the influence of some evil spirit or inauspicious power. And if such disease is to be checked, it should be countered with magic. This notion lasted for a long time or is still so throughout the civilizations or in the people's mind.
2. During 2500-500 B.C. all diseases were taken to be psychosomatic diseases from the view point of the method of treatment developed in Mesopotamia and in ancient India. Moreover, giving suggestion was then one of the major techniques of treatment.
3. We come to know from the writings of B.C. 400 years old Greek philosophers Socrates and Hippocrates that they had a transparent idea about the interrealation of the body and mind. They have even said that, one can not be treated without treating the other.
4. Closer to the end of the Greek civilization in 100 B.C. and within the Roman civilization during 400 A.D., physician Gallen tried to string together the body and mind in the same thread with his humoral theory.
5. In the middle ages, the mysticism and the religion of the primitive ages, widened its importance in every sphere of medical science and the major idea at that time was that 'diseases are caused by committing sins.'
6. At the time of Renaissance, with all the other things, the opportunity of viewing medical science freshly arrived. As a result anatomy, autopsy, microscopy etc. were invented and developed to properly know the normal and abnormal activities of the body with the help of basic sciences. But the mind went to or remained confined within the manuscripts of religion and philosophy (1500-1700 A.D.).

7. Throughout the nineteenth century medical science developed depending on the works of the modern laboratory. Here pathology reached the micro-cellular level of the body and treatment of a single disease started in lieu of the treatment of an entire person. Consequently, psychosomatic medicines were banished. At the beginning, Pavlov was totally influenced with the medical science by his antecedents Bernard, Pasteur, Virchow and Morgagni; but he could solve this problem through his works in a chronic method. But since, 'your theory smacks materialism' (a' la Sherrington) in his fifty years of enriched research, in Western Europe no relation could have been built between the physical ailments and mind based on his theory. 8. In order to fill this void Freud came forth with his psychoanalytical theory. Thereafter came many famous persons such as Alexander, Mayer (who in this regard exhibited that a multifactorial cause is responsible for it.), Dunber, Baymont, Engel and others. Some of them proved its existence in the laboratory like Pavlov.

Since then psychosomatic medicines boldly declared its presence in the Western Medicines. So it got acknowledged all over the world.

Now we will discuss, what Dhirendranath's teachings were in this regard! Incidentally let me tell you that those who are now known as post-traumatic stress disorder (PTSD) etc. in our text books, he used to consider their disease as psychosomatic. If we judge thus, it will be evident that, he used to treat, quite a number of patients of chronic anxiety state and personality disorder who came to him, as psychosomatic diseases.

We have noticed with our clinical rationality that, one surpasses a few abnormal phases of body and mind, before being spotted with this disease. E.g. the first phase is about suddenly getting cautious. Here the patient can realize at the beginning that he is facing a real danger. In order to repel this danger, he undertakes certain measures in his own way, which we call as the stage of prevention. Consequently, certain plans of (ad)aptation would be built within his mind, then he would continue fighting with himself with those techniques in utmost exertion. He would fight to his ability, then he would give up not being able to continue, which we can call the stage of exhaustion. In such cases it becomes evident that, the person would try to limit these techniques within his normal behaviour and according to the capacity of his brain. Due to this reason a difficult fight would go on in his mind. He would continually check and balance the total situation with the long term and short term aptation techniques in his own way. One should keep it in mind that during this time the digestive process throughout his entire body would get affected in order to adjust with the oppression and aptation techniques. The body would caution him in various ways in this regard. It has been noticed that, in this matter the ability of constructing a logical reaction in a person's mind and his techniques of adjusting built through his knowledge and experience, play an important role. Later on while discussing about psychotherapy we will notice that in this case also impact of hypnotic suggestions on a person depends largely on these two subjects.

As for example, the fast recovery of the patient, the will of getting cured, undoubtedly creates a positive process in identifying the course of this disease. It has also been noticed that the patient realizes his endangered situation in his heart. That is, he never has the condition to understand truly how endangering situation has been made for him. In most of the cases in such a situation logic and reasoning do not work inside his mind. That's why Dhirendranath used to say that, is that at all possible to measure how much pressure can this external stimulation create! Naturally we have majorly thought about these things; but could not do anything. E.G. we consider the death of near and dear ones, divorce, separation, loss of job etc. issues as the predominating contributing factors. But practically in case of most of the patients it becomes evident that, according to the patient's statement, without these factors some paltry issues of fear and insecurity have probably made this disease all of a

sudden. He used to explain this incident with Pavlov's 'ultraparadoxical phase' theory (enthusiastic readers may read the book *Pavlov Parichiti* by Dhirendranath to know details about it).

A patient would have physical problems equally proportionately to the stress he would face – the subject is certainly not that simple and straight; but who would have now much trouble and where the course of the disease would end in his case – that becomes impossible to even assume in most of the events. Because firstly the social and familial surroundings of the patient doesn't remain in our control, or we don't know which elements of that surroundings would create enough fear or insecurity in his case. It has been noticed that, in such cases the physical and mental trouble as if makes a vicious circle. That is, increment in the physical trouble increases the mental trouble which in turn helps to raise the physical trouble. Of course, in some of these issues we had a little difference of opinion with him.

As for example, in this connection here we can site the example of peptic ulcer syndrome or pain in the upper abdomen. In many cases it is noticed that, the patient has arbitrarily and randomly taken antacids and pain reducing medicines like omeprazole, cisapride, domperidone or ranitidine, before getting treated here; but that did not benefit the patient. So when Dhirendranath started the treatment, he totally stopped that type of medicines. He too had a reasoning in this regard – if the patient takes a variety of medicines, different medicinal actions and reactions would take place inside of him, consequently his trouble would increase and the disease would get even more complicated.

Again, our logic against this perspective was as following – the patient has taken various antacids for a long time. So, a reaction like rebound phenomena could occur in his body if these medicines are suddenly stopped at present, consequently his disease and trouble could go out of our hands due to the uneasiness of a sudden growth in the disease. Such a difficulty does not occur in case of psychosomatic diseases only. We had to bear the responsibility of the abundant medicines applied by other psychiatrists. It used to take a long time for us to reduce the body-mind dependence of those medicines. However, it's definitely not that we had always won in these cases. A mixed reaction used to take place and the decision in this regard was taken after considering the case history of the particular patient. But he was very cautious in case of certain diseases like hypertension, hypothyroid, diabetes. He did not want to suddenly interfere with the medicines that kept the patient's blood pressure lower.

However, many a trifling problems have been created on the lines of these discussions about the psychosomatic diseases. Yet he was able to make an order regarding the cause and treatment of this disease. It is absolutely impossible to understand in advance what problem belongs to whom. It could be noticed that, even on the first day the patient complained of certain problems which would be altered on the following day. So he used to say, "It should be understood that whenever a patient arrives with a problem, he must have failed to resolve it even with a tough try or that particular problem is troubling him much." However, he used to point at four reasons for the making of this disease in general, e.g. 1. the brain type of the person, 2. the adverse social and familial factors which are present in a greater quantity in his surroundings or in that situation, 3. genetic or biological vulnerability, 4. hidden physical ailments creating pressure on the mind etc..

He had a draft regarding the treatment too. He used to ask the patient to come after two or three weeks, having given him a little anxiolytic drugs. Then he used to carefully record a audio-cassette of suggestions for him. Almost eighty percent illness of the patient used to get cured within two or three sittings. But for the follow-up of the patient for any relapse he used to suggest him – he has to take medicines for a long time in a small amount and listen to the cassette. Likewise his intention in the portion of psychotherapy had been – 1. hypothalamus – pituitary – adrenaline axis and 2. hypothalamus – pituitary – thyroid axis – to

try to bring these two axis, where chaos has been ensued, to order.

In this context let me tell you that I have learnt from him, to what extent rise in the body-weight could be a psychosomatic problem. He personally had an advantage in this matter. He himself used to eat very little and expressed extreme astonishment about how we could eat bigger quantities. Moreover his blood pressure was 90 by 60 mm of Hg. As a result, he got the opportunity to rebuke anybody arbitrarily and randomly with caution word related to eating, rise in the blood pressure and catching diabetes. Normally, the body-weight of the patient increases due to the regular intake of our psychiatry medicines. It becomes evident particularly in case of the medicines like lithium, olanzepine etc.. He used to specially caution the patient and his homemates in this regard. His first question on seeing any small but very fat boy or girl would be, "Does he play?" Because the boy who sheds his sweat, huddling and playing together with all, would never be so corpulent.

Moreover if the body-weight becomes excessive, he has to be given medicines at a much higher doses so that the medicines he is taking get spread in the entire body and reach their required limit in the blood. I have heard again and again from him that in a tropical country like ours, one can carry on eating less food, that's why Gandhiji could have fasted for so many days. A certain housewife was not too aged; but she was quite obese. It was very likely that he spoke out to her, "How would your husband get attracted towards you if your appearance grows at such a rate! The romantic relationship between you two would possibly go away due to your obesity!"

However, a specific time used to be allotted in his treatment or psychotherapy for giving the suggestion about losing the body-weight. If necessary, for this purpose he in his old age days, wearing a coat and trousers used to show before his patients with limb movements, how the flab in the body would reduce through free-hand exercises. He used to often admit in the discussions with us that, increasing body-weight in such a vicious circle that one can not get rid of it as and when wishes to do so. We build up a complicated psychology through our appetite, eating-habits etc..

Drug Addiction

He had made a very distinct complain that drug addiction is regarded more as a moral and emotional problem in our society, than a health problem. But somewhat the entire society, especially the addict's family, gets involved in this matter, when a real problem is made with the addicts. The most familiar among the narcotics is alcohol. Many individuals, who drink regularly yet are moving among us, can be found. It is not very easy to catch them. Perhaps, he is roughly working for his occupation and does not create much disturbance at his home. It was noticed that, he was recently having intense tension and anxiety and due to that reason he had come to Dhirendranath.

After a thorough investigation, he came to know that, the person had the habit of drinking regularly. He would deliver a not-very-long speech on, how bad habit that is in a tropical country like ours. But Dhirendranath in his mind knew for sure that not a single parched paddy would get soaked up with his dry words. So he used to formally say, "There is a hundred percent failure in the treatment of the addicts." With that he also used to say, "Remember that alcohol is the oldest medicine of reducing anxiety. Many people drink to fall asleep."

This manifesto did not succeed even in those states where the sale of alcohol had been prohibited by the law. That's why he had a strong objection to such manifesto. He had given various lectures and also written in papers on this issue. The gist of these was as following: It is almost an impossible task to keep the adults away from the habit of getting addicted. So, they would use 'spurious' drugs from the black market, if they don't get them in the open

market and as a result many people would die to the effect of poison.

Various psychiatric problems can occur due to drinking. That's why, irrespective of the patient, Dhirendranath used to ask everybody whether he had the habit of any kind of addiction. Especially, he used to stay extremely alert about - drinking among the adults and use of hemp and heroin among the adolescents. Even when he felt suspicious, he didn't exempt the patient so easily and used to ask questions in a round-about manner. As drinking or taking drugs is a matter of disgrace, many patients used to suppress the fact or speak of taking smaller amounts. Then he wanted to know specifically, how long he had been drinking, how many pegs did he take per day, which brand did he take (to know the percentage of alcohol) etc.. He used to also caution about the various disturbances which might occur in the body and mind of those who had been taking drugs for a long time in a generous amount and had suddenly stopped that.

He conceived that minimum 10% of male adult population in our society takes narcotic drugs at some time in their life and 5% of it fails to give up forever. It should be rather said that, they themselves quickly depart from this world after bothering others due to their addiction problems. In our society the women folk almost don't take narcotics compared to the foreign countries. On the otherhand, they hate addiction the most because they are the most tormented ones due to such addiction in the family. They try to the best of their abilities to free their husbands from addiction, when the later get addicted.

But, in this matter Dhirendranath had roughly the following formulae: 1. The addict has to keep a strong motivation of something like he wants to get rid of the addiction. 2. He has to remain self-exiled for at least six months in order to distant himself from the availability and association. 3. In spite of it he will have the cravings for substance, then he has to take medicines and suggestions in order to repel that. In most of the cases his clients could not follow these formulae till the end, consequently it became impossible to free them from addiction.

In this context I should say that, Dhirendranath would have cautioned the folks at home in this regard, if the patient had any other psychiatric diseases and would have also made them understand that, this problem of the patient might increase further if it was not treated. But I should better admit that, the result was not good in most of the cases and then he used to mutter, 'faulty design'. We had a discussion in this connection and here a few words may be said in this regard.

He conceived that, roughly 10% population of our society is more or less handicapped in some way or the other, due to genetic vulnerability and the interaction based reasons between the environment and the genes. This issue specially gained importance in the discussions, when we became sure on having performed a varied scrutiny of the villages and cities that, the number of mentally handicapped is in general higher in our total population. And in the process of taking the case-history of every type of psychiatric patients, especially on having performed a scrutiny among the people in the rural areas it became evident that many children were being borned handicapped or falling prey to mental diseases as a result of various mismanagements during the antenatal, natal and postnatal care.

Even during pregnancy and delivery these problems become more and more visible due to malnutrition and various forms of injuries to the brain, especially in the rural areas. Time and again we have talked in different discussions and programmes, written books and informed the concerned authority about this matter. But we have got no response. So, we would have started our discussion supposing that, our suggestion towards the prevention of psychiatric diseases have largely failed. Then the main issue of this discussion would have been, a certain number of handicapped persons of our society are dependant and supplicating on it in a wider sense. Who are among this populace?

It was noticed that, there are physically handicapped, addicts, habitual offenders, mentally handicapped, chronic schizophrenics, vagabonds etc. in this collection. On summing up their number would stand at a 10% or may be a little more, of the total population. Certainly they all don't seek the same kind of help. Some of them need less assistance and the others need more. We have to try to run the society by making them self-reliant with as little help as possible and also maintaining their human dignity.

Throughout his entire life, Dhirendranath had written many things about this issue, most of which was about placing an appeal before the greater society and the administration. The intention was to make some arrangements for these weak people on having thought about them. His formula about the addicts was simply 'harm reduction'. That is, the addicts will obviously take narcotics, in no way they can be desisted from such things for long. But one has to try to keep him normal and active by applying as little drug, or in lieu of it as less harmful drug, as possible.

Likewise, in matter of the mentally handicapped too, he planned for day-care centres, where the comparatively better and normal handicapped persons would look after the others. Perhaps a few trained individuals would manage this whole situation. He used to speak of, in the morning the centre's van would move around and pick up these people from different parts of the city or metropolis and keep them in that day-care centre. They stay the whole day in the institution, do various works, then towards the evening they are dropped in their homes. If in the mean time someone falls sick, the folks at his home are informed and then he is discharged after keeping him admitted and treated there for a few days. In the process their families also get some relief.

But the problem is that only the government can run such an institution. Because the socioeconomic condition of the families of the handicapped persons is comparatively much worse, so it is not possible for them to supply the money required to run such institution. He put up several appeals before the government in this matter; but nothing bore fruit. He didn't at all like the general fuss that is made with the addicts. It was of his dislike more due to the reason that the organizers do all these things for a few days, then their enthusiasm is ebbed. He used to verbally say and also consider it as a problem of psychiatry. When he was invited in any meeting or committee in this matter, he would have told the organizers beforehand that, he would say only what he had observed or understand, whether anybody liked that or not. I have also seen him to quarrel in this matter with big-wigs. But he was very stubborn and firm regarding his thoughts. He also had disagreement with many due to this reason.

P A S

Nothing in Biology Makes Sense Except in the Light of Evolution

Theodosius Dobzhansky (1900-1975)

As recently as 1966, sheik Abdel Aziz bin Baz asked the king of Saudi Arabia to suppress a heresy that was spreading in his land. Wrote the sheik :

"The Holy Koran, the Prophet's teachings, the majority of Islamic scientists, and the actual facts all prove that the sun is running in its orbit ... and that the earth is fixed and stable, spread out by God for his mankind ... Anyone who professed otherwise would utter a charge of falsehood toward God, the Koran, and the Prophet."

The good sheik evidently holds the Copernican theory to be a "mere theory," not a "fact."

In this he is technically correct. A theory can be verified by a mass of facts, but it becomes a proven theory, not a fact. The sheik was perhaps unaware that the Space Age had begun before he asked the king to suppress the Copernican heresy. The sphericity of the earth has been seen by astronauts, and even by many earth-bound people on their television screens. Perhaps the sheik could retort that those who venture beyond the confines of God's earth suffer hallucinations, and that the earth is really flat.

Parts of the Copernican world model, such as the contention that the earth rotates around the sun, and not vice versa, have not been verified by direct observations even to the extent the sphericity of the earth has been. Yet scientists accept the model as an accurate representation of reality. Why? Because it makes sense of a multitude of facts which are otherwise meaningless or extravagant. To nonspecialists most of these facts are unfamiliar. Why then do we accept the "mere theory" that the earth is sphere revolving around a spherical sun? Are we simply submitting to authority? Not quite : we know that those who took the time to study the evidence found it convincing.

The good sheik is probably ignorant of the evidence. Even more likely, he is so hopelessly biased that no amount of evidence would impress him. Anyway, it would be sheer waste of time to attempt to convince him. The Koran and the Bible do not contradict Copernicus, nor does Copernicus contradict them. It is ludicrous to mistake the Bible and the Koran for primers of natural science. They treat of matters even more important : the meaning of man and his relations to God. They are written in poetic symbols that were understandable to people of the age when they were written, as well as to peoples of all other ages. The king of Arabia did not comply with the sheik's demand. He knew that some people fear enlightenment, because enlightenment threatens their vested interest. Education is not to be used to promote obscurantism.

The earth is not the geometric center of the universe, although it may be its spiritual center. It is a mere speck of dust in the cosmic spaces. Contrary to Bishop Ussher's calculations, the world did not appear in approximately its present state in 4004 BC. The estimates of the age of the universe given by modern cosmologists are still only rough approximation, which are revised (usually upward) as the methods of estimation are refined. Some cosmologists take the universe to be about 10 billion years old; others suppose that it may have existed, and will continue to exist, eternally. The origin of life on earth is dated tentatively between 3 and 5 billion years ago; manlike beings appeared relatively quite recently, between 2 and 4 million years ago. The estimates of the age of the earth, of the duration of the geologic and paleontologic eras, and of the antiquity of man's ancestors are now based mainly on radiometric evidence the proportions of isotopes of certain chemical elements in rocks suitable for such studies.

Sheik bin Baz and his like refuse to accept the radiometric evidence, because it is a "mere theory." What is the alternative? One can suppose that the Creator saw fit to play deceitful trick on geologists and biologists. He carefully arranged to have various rocks provided with isotope ratios just right to mislead us into thinking that certain rocks are 2 billion years old, others 2 million, which in fact they are only some 6,000 years old. This kind of pseudo explanation is not very new. One of the early antievolutionists, P.H. Gosse, published a book entitled *Omphalos* ("the Navel"). The gist of this amazing book is that Adam, though he had no mother, was created with a navel, and that fossils were placed by the Creator where we find them now - a deliberate act on His part, to give the appearance of great antiquity and geologic upheavals. It is easy to see the fatal flaw in all such notions. They are blasphemies, accusing God of absurd deceitfulness. This is as revolting as it is uncalled for.

Diversity of Living Beings

The diversity and the unity of life are equally striking and meaningful aspects of the living world. Between 1.5 and 2 million species of animals and plants have been described and studied; the number yet to be described is probably as great. The diversity of sizes, structures, and ways of life is staggering but fascinating. Here are just a few examples.

The foot-and-mouth disease virus is a sphere 8-12 μ in diameter. The blue whale reaches 30 m in length and 135 ton in weight. The simplest viruses are parasites in cells of other organisms, reduced to barest essentials minute amounts of DNA or RNA, which subvert the biochemical machinery of the host cells to replicate their genetic information, rather than that of the host.

It is a matter of opinion, or of definition, whether viruses are considered living organisms or peculiar chemical substances. The fact that such differences of opinion can exist is in itself highly significant. It means that the borderline between living and inanimate matter is obliterated. At the opposite end of the simplicity complexity spectrum you have vertebrate animals, including man. The human brain has some 12 billion neurons; the synapses between the neurons are perhaps a thousand times numerous.

Some organisms live in a great variety of environments. Man is at the top of the scale in this respect. He is not only a truly cosmopolitan species but, owing to his technologic achievements, can survive for at least a limited time on the surface of the moon and in cosmic spaces. By contrast, some organisms are amazingly specialized. Perhaps the narrowest ecologic niche of all is that of a species of the fungus family Laboulbeniaceae, which grows exclusively on the rear portion of the elytra of the beetle *Aphenops cronei*, which is found only in some limestone caves in southern France. Larvae of the fly *Psilopa petrolei* develop in seepages of crude oil in California oilfields; as far as is known they occur nowhere else. This is the only insect able to live and feed in oil, and its adult can walk on the surface of the oil only as long as no body part other than the tarsi are in contact with the oil. Larvae of the fly *Drosophila carciphila* develop only in the nephric grooves beneath the flaps of the third maxilliped of the land crab *Geocarcinus ruricola*, which is restricted to certain islands in the Caribbean.

Is there an explanation, to make intelligible to reason this colossal diversity of living beings? Whence came these extraordinary, seemingly whimsical and superfluous creatures, like the fungus *Laboulbenia*, the beetle *Aphenops cronei*, the flies *Psilopa petrolei* and *Drosophila carciphila*, and many, many more apparent biologic curiosities? The only explanation that makes sense is that the organic diversity has evolved in response to the diversity of environment on the planet earth. No single species, however perfect and however versatile, could exploit all the opportunities for living. Every one of the millions of species has its own way of living and of getting sustenance from the environment. There are doubtless many other possible ways of living as yet unexploited by any existing species; but one thing is clear: with less organic diversity, some opportunities for living would remain unexploited. The evolutionary process tends to fill up the available ecologic niches. It does not do so consciously or deliberately; the relations between evolution and environment are more subtle and more interesting than that. The environment does not impose evolutionary changes on its inhabitants, as postulated by the now abandoned neo-Lamarckian theories. The best way to envisage the situation is as follows : the environment presents challenges to living species, to which the later may respond by adaptive genetic changes.

An unoccupied ecologic niche, an unexploited opportunity for living, is a challenge. so is an environmental change, such as the Ice Age climate giving place to a warmer climate. Natural selection may cause a living species to respond to the challenge by adaptive genetic changes. These changes may enable the species to occupy the formerly empty ecologic niche as a new opportunity for living, or to resist the environmental change if it is unfavorable. But the response may or may not be successful. This depends on many factors, the chief of which is the genetic composition of the responding species at the time the response is called for. Lack of successful response may cause the species to become extinct. The evidence of fossils shows clearly that the eventual end of most evolutionary lines is extinction. Organisms now living are successful descendants of only a minority of the species that lived in the past and of smaller and smaller minorities the further back you look. Nevertheless, the number of living species has not dwindled; indeed, it has probably grown with time. All this is understandable in the light of evolution theory; but what a senseless operation it would have been, on God's part, to fabricate a multitude of species *ex nihilo* and then let most of them die out!

There is, of course, nothing conscious or intentional in the action of natural selection. A biologic species does not say to itself, "Let me try tomorrow (or a million years from now) to grow in a different soil, or use a different food, or subsist on a different body part of a different crab." Only a human being could make such conscious decisions. This is why the species *Homo sapiens* is the apex of evolution. Natural selection is at one and the same time a blind and creative process. Only a creative and blind process could produce, on the one hand, the tremendous biologic success that is the human species and, on the other, forms of adaptedness as narrow and as constraining as those of the overspecialized fungus, beetle, and flies mentioned above.

Antievolutionists fail to understand how natural selection operates. They fancy that all existing species were generated by supernatural fiat a few thousand years ago, pretty much as we find them today. But what is the sense of having as many as 2 or 3 million species living on earth? If natural selection is the main factor that brings evolution about, any number of species is understandable: natural selection does not work according to a foreordained plan, and species are produced not because they are needed for some purpose but simply because there is an environmental opportunity and genetic wherewithal to make them possible. Was the Creator in a jocular mood when he made *Psilopa petrolei* for California oil fields and species of *Drosophila* to live exclusively on some body-parts of certain land crabs on only certain islands in the Caribbean? The organic diversity becomes, however, reasonable and understandable if the Creator has created the living world not by caprice but by evolution propelled by natural selection. It is wrong to hold creation and evolution as mutually exclusive alternatives. I am a creationist and an evolutionist. Evolution is God's or Nature's method of creation. Creation is not an event that happened in 4004 BC; it is a process that began some 10 billion years ago and is still under way.

Unity of Life

The unity of life is no less remarkable than its diversity. Most forms of life are similar in many respects. The universal biologic similarities are particularly striking in the biochemical dimension. From viruses to man, heredity is coded in just two, chemically related substances: DNA and RNA. The genetic code is as simple as it is universal. There are only four genetic "letters" in DNA: adenine, guanine, thymine, and cytosine. Uracil replaces thymine in RNA. The entire evolutionary development of the living world has taken place not by invention of new "letters"

in the genetic "alphabet" but by elaboration of ever-new combinations of these letters.

Not only is the DNA-RNA genetic code universal, but so is the method of translation of the sequences of the "letters" in DNA-RNA into sequences of amino acids in proteins. The same 20 amino acids compose countless different proteins in all, or at least in most, organisms. Different amino acids are coded by one to six nucleotide triplets in DNA and RNA. And the biochemical universals extend beyond the genetic code and its translation into proteins: striking uniformities prevail in the cellular metabolism of the most diverse living beings. Adenosine triphosphate, biotin, riboflavin, hemes, pyridoxin, vitamins K and B12, and folic acid implement metabolic processes every where.

What do these biochemical or biologic universals mean? They suggest that life arose from inanimate matter only once and that all organisms, no matter how diverse, in other respects, conserve the basic features of the primordial life. (It is also possible that there were several, or even many, origins of life; if so, the progeny of only one of them has survived and inherited the earth.) But what if there was no evolution and every one of the millions of species were created by separate fiat? However offensive the notion may be to religious feeling and to reason, the antievolutionists must again accuse the Creator of cheating. They must insist that He deliberately arranged things exactly as if his method of creation was evolution, intentionally to mislead sincere seekers of truth.

The remarkable advances of molecular biology in recent years have made it possible to understand how it is that diverse organisms are constructed from such monotonously similar materials: proteins composed of only 20 kinds of amino acids and coded only by DNA and RNA, each with only four kinds of nucleotides. The method is astonishingly simple. All English words, sentences, chapters, and books are made up of sequences of 26 letters of the alphabet. (They can be represented also by only three signs of the Morse code: dot, dash, and gap.) The meaning of a word or a sentence is defined not so much by what letters it contains as by the sequences of these letters. It is the same with heredity: it is coded by the sequences of the genetic "letters" the nucleotides in the DNA. They are translated into the sequences of amino acids in the proteins.

Molecular studies have made possible an approach to exact measurements of degrees of biochemical similarities and differences among organisms. Some kinds of enzymes and other proteins are quasiuniversal, or at any rate widespread, in the living world. They are functionally similar in different living beings, in that they catalyze similar chemical reactions. But when such proteins are isolated and their structures determined chemically, they are often found to contain more or less different sequences of amino acids in different organisms. For example, the so-called alpha chains of hemoglobin have identical sequences of amino acids in man and the chimpanzee, but they differ in a single amino acid (out of 141) in the gorilla. Alpha chains of human hemoglobin differ from cattle hemoglobin in 17 amino acid substitutions, 18 from horse, 20 from donkey, 25 from rabbit, and 71 from fish (carp).

Cytochrome C is an enzyme that plays an important role in the metabolism of aerobic cells. It is found in the most diverse organisms, from man to molds. E. Margolisash, W.M. Fitch, and others have compared the amino acid sequences in cytochrome C in different branches of the living world. Most significant similarities as well as differences have been brought to light. The cytochrome C of different orders of mammals and birds differ in 2 to 17 amino acids, classes of vertebrates in 7 to 38, and vertebrates and insects in 23 to 41; and animals differ from yeasts and moulds in 56 to 72 amino acids. Fitch and Margolisash prefer to express their findings in what are called "minimal mutational distances." It has been

mentioned above that different amino acids are coded by different triplets of nucleotides in DNA of the genes; this code is now known. Most mutations involve substitutions of single nucleotides somewhere in the DNA chain coding for a given protein. Therefore, one can calculate the minimum numbers of single mutations needed to change the cytochrome C of one organism into that of another. Minimal mutational distances between human cytochrome C and the cytochrome C of other living beings are as follows:

Money	1	Chicken	18
Dog	13	Penguin	18
Horse	17	Turtle	19
Donkey	16	Rattlesnake	20
Pig	13	Fish (tuna)	31
Rabbit	12	Fly	33
Kangaroo	12	Moth	36
Duck	17	Mould	63
Pigeon	16	Yeast	56

It is important to note that amino acid sequences in a given kind of protein vary within a species as well as from species to species. It is evident that the differences among proteins at the level of species, genus, family, order, class, and phylum are compounded of elements that vary also among individuals within a species. Individual and group differences are only quantitatively, not qualitatively, different. Evidence supporting the above propositions is ample and is growing rapidly. Much work has been done in recent years on individual variations in amino acid sequences of hemoglobin of human blood. More than 100 variants have been detected. Most of them involve substitutions of single amino acids – substitutions that have arisen by genetic mutations in the persons in whom they are discovered or in their ancestors. As expected, some of these mutations are deleterious to their carriers, but others apparently are neutral or even favorable in certain environments. Some mutant hemoglobins have been found only in one person or in one family; others are discovered repeatedly among inhabitants of different parts of the world. I submit that all these remarkable findings make sense in the light of evolution: they are nonsense otherwise.

Comparative Anatomy and Embryology

The biochemical universals are the most impressive and the most recently discovered, but certainly they are not the only vestiges of creation by means of evolution. Comparative anatomy and embryology proclaim the evolutionary origins of the present inhabitants of the world. In 1555 Pierre Belon established the presence of homologous bones in the superficially very different skeletons of man and bird. Later anatomists traced the homologies in the skeletons, as well as in other organs, of all vertebrates. Homologies are also traceable in the external skeletons of arthropods as seemingly unlike as a lobster, a fly, and a butterfly. Examples of homologies can be multiplied indefinitely.

Embryos of apparently quite diverse animals often exhibit striking similarities. A century ago these similarities led some biologists (notably the German zoologist Ernst Haeckel) to be carried by their enthusiasm as far as to interpret the embryonic similarities as meaning that the embryo repeats in its development the evolutionary history of its species: it was said to pass through stages in which it resembles its remote ancestors. In other words, early-day

biologists supposed that by studying embryonic development one can, as it were, read off the stages through which the evolutionary development had passed. This so-called biogenetic law is no longer credited in its original form. And yet embryonic similarities are undeniable impressive and significant.

Probably everybody knows the sedentary barnacles which seem to have no similarity to freeswimming crustaceans, such as the copepods. How remarkable that barnacles pass through a free-swimming larval stage, the nauplius! At that stage of its development a barnacle and a Cyclops look unmistakably similar. They are evidently relatives. The presence of gill slits in human embryos and in embryos of other terrestrial vertebrates is another famous example. Of course, at no stage of its development is a human embryo a fish, nor does it ever have functioning gills. But why should it have unmistakable gill slits unless its remote ancestors did respire with the aid of gills? It is the Creator again playing practical jokes?

Adaptive radiation : Hawaii's Flies

There are about 2,000 species of drosophilid flies in the world as a whole. About a quarter of them occur in Hawaii, although the total area of the archipelago is only about that of the state of New Jersey. All but 17 of the species in Hawaii are endemic (found nowhere else). Furthermore, a great majority of the Hawaiian endemics do not occur throughout the archipelago: they are restricted to single islands or even to a part of an island. What is the explanation of this extraordinary proliferation of drosophilid species in so small a territory? Recent work of H.L. Carson, H.T. Spieth, D.E. Hardy, and others makes the situation understandable.

The Hawaiian Islands are of volcanic origin; they were never parts of any continent. Their ages are between 5.6 and 0.7 million years. Before man came there inhabitants were descendants of immigrants that had been transported across the ocean by air currents and other accidental means. A single drosophilid species, which arrived in Hawaii first, before there were numerous competitors, faced the challenge of an abundance of many unoccupied ecologic niches. Its descendants responded to this challenge by evolutionary adaptive radiation, the products of which are the remarkable Hawaiian drosophilids of today. To forestall a possible misunderstanding, let it be made clear that the Hawaiian endemics are by no means so similar to each other that they could be mistaken for variants of the same species; if anything, they are more diversified than are drosophilids elsewhere. The largest and the smallest drosophilid species are both Hawaiian. They exhibit an astonishing variety of behavior patterns. Some of them have become adapted to ways of life quite extraordinary for a drosophilid fly, such as being parasites in egg cocoons of spiders.

Oceanic islands other than Hawaii, scattered over the wide Pacific Ocean, are not conspicuously rich in endemic species of drosophilids. The most probable explanation of this fact is that these other islands were colonized by drosophilid after most ecologic niches had already been filled by earlier arrivals. This surely is a hypothesis, but it is a reasonable one. Antievolutionists might perhaps suggest an alternative hypothesis: in a fit of absentmindedness, the Creator went on manufacturing more and more drosophilid species for Hawaii, until there was an extravagant surfeit of them in this archipelago. I leave it up to you to decide which hypothesis makes sense.

Strength and Acceptance of the Theory

Seen in the light of evolution, biology is, perhaps, intellectually the most satisfying and

inspiring science. Without that light it becomes a pile of sundry facts some of them interesting or curious but making no meaningful picture as a whole.

This is not imply that we know everything that can and should be known about biology and about evolution. Any competent biologist is aware of a multitude of problems yet unresolved and of questions yet unanswered. After all, biologic research shows no sign of approaching completion; quite the opposite is true. Disagreements and clashes of opinion are rife among biologists, as they should be in a living and growing science. Antievolutionists mistake, or pretend to mistake, these disagreements as indications of dubiousness of the entire doctrine of evolution. Their favorite sport is stringing together quotations, carefully and sometimes expertly taken out of context, to show that nothing is really established or agreed upon among evolutionists. Some of my colleagues and myself have been amused and amazed to read ourselves quoted in a way showing that we are really antievolutionists under the skin.

Let me try to make crystal clear what is established beyond reasonable doubt, and what needs further study, about evolution. Evolution as a process that has always gone on in the history of the earth can be doubted only by those who are ignorant of the evidence or are resistant to evidence, owing to emotional blocks or to plain bigotry. By contrast, the mechanisms that bring evolution about certainly need study and clarification. There are no alternatives to evolution as history that can withstand critical examination. Yet we are constantly learning new and important facts about evolutionary mechanisms.

It is remarkable that more than a century ago Darwin was able to discern so much about evolution without having available to him the key facts discovered since. The development of genetics after 1900 especially of molecular genetics, in the last two decades has provided information essential to the understanding of evolutionary mechanisms. But much is in doubt and much remains to be learned. This is heartening and inspiring for any scientist worth his salt. Imagine that everything is completely known and that science has nothing more to discover: what a nightmare!

Does the evolutionary doctrine clash with religious faith? It does not. It is a blunder to mistake the Holy Scriptures for elementary textbooks of astronomy, geology, biology, and anthropology. Only if symbols are construed to mean what they are not intended to mean can there arise imaginary, insoluble conflicts. As pointed out above, the blunder leads to blasphemy: the Creator is accused of systematic deceitfulness.

One of the great thinkers of our age, Pierre Teilhard de Chardin, wrote the following: "Is evolution a theory, a system, or a hypothesis? It is much more. It is a general postulate to which all theories, all hypotheses, all systems much henceforward bow and which they must satisfy in order to be thinkable and true. Evolution is a light which illuminates all facts, a trajectory which all lines of thought must follow this is what evolution is." Of course, some scientists, as well as some philosophers and theologians, disagree with some parts of Teilhard's teachings; the acceptance of his worldview falls short of universal. But there is no doubt at all that Teilhard was a truly and deeply religious man and that Christianity was the cornerstone of his worldview. Moreover, in his worldview science and faith were not segregated in watertight compartments, as they are with so many people. They were harmoniously fitting parts of his worldview. Teilhard was a creationist, but one who understood that the Creation is realized in this world by means of evolution.

[Transcribed from American Biology Teacher, March 1973 (35:125-129)] **P A S**

Ivan Petrovich Pavlov (1924)

Lectures on the Work of the Cerebral Hemisphere, Lecture One

Gentlemen,

One cannot but be struck by a comparison of the following facts. First the cerebral hemispheres, the higher part of the central nervous system, is a rather impressive organ. In structure it is exceedingly complex, comprising millions and millions (in man-even billions) of cells, i.e., centres or foci of nervous activity. These cells vary in size, shape and arrangement and are connected with each other by countless branches. Such structural complexity naturally suggests a very high degree of functional complexity. Consequently, it would seem that a boundless field of investigation is offered here for the physiologist. Secondly, take the dog, man's companion and friend since prehistoric times, in its various roles as hunter, sentinel, etc. . We know that this complex behaviour of the dog, its higher nervous activity (since no one will dispute that this is higher nervous activity), is chiefly associated with the cerebral hemispheres. If we remove the cerebral hemispheres in the dog (Goltz and others), it becomes incapable of performing not only the roles mentioned above, but even of looking after itself. It becomes profoundly disabled and will die unless well cared for. This implies that both in respect of structure and function, the cerebral hemispheres perform considerable physiological work.

Let us turn now to man. His entire higher nervous activity is also dependent on the normal structure and functioning of the cerebral hemispheres. The moment the complex structure of his hemispheres is damaged or disturbed in one way or another, he also becomes an invalid; he can no longer freely associate with his fellows as an equal and must be isolated.

In amazing contrast to this boundless activity of the cerebral hemispheres is the scant content of the present-day physiology of these hemispheres. Up to 1870 there was no physiology of the cerebral hemispheres at all; they seemed inaccessible to the physiologist.

It was in that year that Fritsch and Hitzig first successfully applied the ordinary physiological methods of stimulation and destruction to their study. Stimulation of certain parts of the cerebral cortex regularly evoked contraction in definite groups of the skeletal muscles (the cortical motor region). Extirpation of these parts led to certain disturbances in the normal activity of the corresponding groups of muscles.

Shortly afterwards H. Munk, Ferrier and others demonstrated that other regions of the cortex, seemingly not susceptible to artificial stimulation, are also functionally differentiated. Removal of these parts leads to defects in the activity of certain receptor organs—the eye, the ear and the skin.

Many researchers have been thoroughly investigating these phenomena. More precision and more details have been obtained, especially as regards the motor region, and this knowledge has even found practical application in medicine; however, investigation as yet has not gone far beyond the initial point. The essential fact is that the entire higher and complex behaviour of the animal, which is dependent on the cerebral hemispheres, as shown by the previously mentioned experiment by Goltz with the extirpation of the hemispheres in a dog, has hardly been touched upon in these investigations and is not included even in the pro-

gramme of current physiological research, what do the facts relating to the cerebral hemispheres, which are now at the disposal of the physiologist, explain with regard to the behaviour of the higher animals? Is there a general scheme of the higher nervous activity? What kind of general rules govern this activity? The contemporary physiologist finds himself truly empty-handed when he has to answer these lawful questions. While the object of investigation is highly complex in relation to structure, and extremely rich in function, research in this sphere remains, as it were, in a blind alley, unable to open up before the physiologist the boundless vistas which might have been expected.

Why is this so? The reason is clear, the work of the cerebral hemispheres has never been regarded from the same point of view as that of other organs of the body, or even other parts of the central nervous system. It has been described as special *psychical* activity which we feel and apprehend in ourselves and which we suppose exists in animals by analogy with human beings. Hence the highly peculiar and difficult position of the physiologist. On the one hand, the study of the cerebral hemispheres, as of all other parts of the organism, seems to come within the scope of physiology. What, then, should be the attitude of the physiologist? Should he first acquire psychological methods and knowledge and only then begin to study the activity of the cerebral hemispheres? But there is a real complication here. It is quite natural that physiology, in analysing living matter, should always base itself on the more exact and advanced sciences—mechanics, physics and chemistry. But here we are dealing with an altogether different matter, since in this particular case we should have to rely on a science which has no claim to exactness as compared with physiology. Unit recently discussion revolved even around the question whether psychology should be considered a natural science or a science at all. Without going deeply into this question, I should like to site some facts which, although crude and superficial, seem to me very convincing. Even the psychologists themselves do not regard their science as being exact. Not so long ago James, an outstanding American psychologist, called psychology not a science, but a "hope for science." Another striking illustration has been provided by Wundt, formerly a physiologist, who became a celebrated psychologist and philosopher and even the founder of the so-called experimental psychology. Prior to the war, in 1913, a discussion took place in Germany as to the advisability of separating the psychological branch of science from the philosophical in the universities, i.e., of having two separate chairs instead of one. Wundt opposed separation, one of his arguments being the impossibility of establishing a 'common and obligatory examination programme' in psychology, since each professor had his own ideas of the essence of psychology. Is it not clear, then, that psychology has not yet reached the stage of an exact science?

This being the case, there is no need for the physiologist to have recourse to psychology. In view of the steadily developing natural science it would be more logical to expect that not psychology should render assistance to the physiology of the cerebral hemispheres, but, on the contrary, physiological investigation of the activity of this organ in animals should lay the foundation for the exact scientific analysis of the human subjective world. Consequently, physiology must follow its own path — the path blazed for it long ago. Taking as his starting-point the assumption that the functioning of the animal's organism, unlike that of the human being, is similar to the work of a machine, Descartes' three hundred years ago evolved the idea of the reflex as the basic activity of the nervous system. Descartes regarded every activity of the animal nervous system was placed on the firm basis of natural science. In the eighteenth, nineteenth and twentieth centuries the idea of the reflex had been extensively used by physiologists, but only in their work on the lower parts of the central nervous system;

gradually, however, they began to study its higher parts, until finally, after Sherrington's classical works on spinal reflexes, Magnus, his successor, established the reflex nature of all the basic locomotor activities of the organism. And so experiment fully justified the idea of the reflex which, thereafter, was used in the study of the central nervous system almost up to the cerebral hemispheres. It is to be hoped that the more complex activities of the organism, including the basic locomotor reflexes — states so far referred to in psychology as anger, fear, playfulness, etc. — will soon be related to the simple reflex activity of the subcortical parts of the brain.

A bold attempt to apply the idea of the reflex to the cerebral hemispheres not only of animals but also of man, was made by I.M. Sechenov, the Russian physiologist, on the basis of the contemporary physiology of the nervous system. In a paper published in Russian in 1863 and entitled *Reflexes of the Brain* Sechenov characterised the activity of the cerebral hemispheres as reflex, i.e., determined activity. He regarded thoughts as reflexes in which the effector end is inhibited, and affects as exaggerated reflexes with a wide irradiation of excitation. A like attempt has been made in our time by Ch. Richet who introduced the concept of the psychical reflex in which the reaction to a given stimulus is determined by its union with the traces left in the cerebral hemispheres by previous stimuli. Generally, the recent physiology of the higher nervous activity related to the cerebral hemispheres tends to associate acting stimulation with traces left by previous ones (associative memory — according to J. Loeb; training, education by experience — according to other physiologists). But this was mere theorising. The time had come for a transition to experimental analysis of the subject, and from the objective external aspect, as is the case with any other branch of natural science. This transition was determined by comparative physiology which had just made its appearance as a result of the influence of the theory of evolution. Now that it had turned its attention to the entire animal kingdom, physiology, in dealing with its lower representatives, was forced, of necessity, to abandon the anthropomorphic concept and concentrate on the scientific elucidation of the relations between the external agents influencing the animal and the responsive external activity, the locomotor reaction of the latter. This gave birth to J.Loeb's doctrine of animal tropisms; to the suggestion by Beer, Bethe and Uexkull of an objective terminology for designating the animal reactions; and finally, to the investigation by zoologists of the behaviour of the lower representatives of the animal world, by means of purely objective methods, by comparing the effect of external influences on the animal with its responsive external activity — as for example in the classical work of Jennings, etc..

Influenced by this new tendency in biology and having a practical cast of mind, American psychologists who also became interested in comparative psychology displayed a tendency to subject the external activity of animals to experimental analysis under deliberately induced conditions. Thorndike's *Animal Intelligence* (1898) must be regarded as the starting-point for investigations of this kind. In these investigations the animal was kept in a box and food placed outside, within sight. The animal, naturally, tried to reach the food, but to do so it had to open the door which in the different experiments was fastened in a different way. Tables and charts registered the speed and the manner in which the animal solved this problem. The entire process was interpreted as the formation of an association, connection between the visual and the tactile stimulation and the locomotor activity. Afterwards by means of this method, and by modifications of it, researchers studied numerous questions relating to the associative ability of various animals. Almost simultaneously with the above-mentioned work by Thorndike, of which I was not then aware, I too had arrived at the idea of the need for a

similar attitude to the subject. The following episode, which occurred in my laboratory, gave birth to the idea.

While making a detailed investigation of the digestive glands I had to busy myself also with the so-called psychical stimulation of the glands. When, together with one of my collaborators, I attempted a deeper analysis of this fact, at first in the generally accepted way, i.e., psychologically, visualising the probable thoughts and feelings of the animal, I stumbled on a fact unusual in laboratory practice. I found myself unable to agree with my colleague; each of us stuck to his point of view, and we were unable to convince each other by certain experiments. This made me definitely reject any further psychological discussion of the subject, and I decided to investigate it in a purely objective way, externally, i.e., strictly recording all stimuli reaching the animal at the given moment and observing its corresponding responses either in the form of movements or in the form of salivation (as occurred in this particular case).

This was the beginning of the investigations that I have carried on now for the past twenty-five years with the participation of numerous colleagues who joined hand and brain with me in this work and to whom I am deeply grateful. We have, of course, passed through different stages, and the subject has been advanced only gradually. At first we had but a few separate facts at our disposal, but today so much material has been accumulated by us that we can make an attempt to present it in a more or less systematised form. I am now in a position to place before you a physiological theory of the activity of the cerebral hemispheres which at any rate conforms much more to the structural and functional complexity of this organ than the theory which until now has been based on a few fragmentary, though very important, facts of modern physiology.

Thus, research along these new lines of strictly objective investigation of the higher nervous activity has been carried out mainly in my laboratories (with the participation of a hundred colleagues); work along the same lines has been carried out also by American psychologists. As for other physiological laboratories, so far only a few have begun, starting somewhat later, to investigate this subject, but in most cases their work is still in the initial stage. So far there has been one essential point of difference in the research of the Americans and in ours. Since in the case of the Americans the objective investigation is being conducted by psychologists, this means that, although psychologists study the facts from the purely external -- aspect, nevertheless, in posing the problems, in analysing and formulating the results, they tend to think more in terms of psychology. The result is that with the exception of the group of "behaviourists" their work does not bear a purely physiological character. Whereas, we, having started from physiology, invariably and strictly adhere to the physiological point of view, and we are investigating and systematising the whole subject solely in a physiological way.

I shall now pass to an exposition of our material, but before doing so I should like to touch on the concept of the reflex in general, on reflexes in physiology and the so-called instincts.

In the main we base ourselves on Descartes' concept of the reflex. Of course, this is a genuinely scientific concept, since the phenomenon implied by it can be strictly determined. It means that a certain of the external world, or of the organism's internal medium produces a certain effect in one or other nervous receptor, which is transformed into a nervous process, into nervous excitation. The excitation is transmitted along certain nerve fibres, as if along an electric cable, to the central nervous system; thence, thanks to the established nervous connections, it passes along other nerve fibres to the working organ, where it in its turn is

transformed into a special activity of the cells of this organ. Thus, the stimulating agent proves to be indispensably connected with the definite activity of the organism, as cause and effect.

It is quite obvious that the entire activity of the organism is governed by definite laws. If the animal were not (in the biological sense) strictly adapted to the surrounding world, it would, sooner or later, cease to exist. If instead of being attracted by food, the animal turned away from it, or instead of avoiding fire threw itself into it, and so on, it would perish. The animal *must* so react to the environment that all its responsive activity ensures its existence. The same is true if we think of life in terms of mechanics, physics and chemistry. Every material system can exist as an entity only so long as its internal forces of attraction, cohesion, etc., are equilibrated with the external forces influencing it. This applies in equal measure to such a simple object as a stone and to the most complex chemical substance, and it also holds good for the organism. As a definite material system complete in itself, the organism can exist only so long as it is in equilibrium with the environment; the moment this equilibrium is seriously disturbed, the organism ceases to exist as a particular system. Reflexes are the elements of this constant adaptation or equilibration. Physiologists have studied and are studying numerous reflexes, these indispensable, machine-like reactions of the organism, which at the same time are inborn, i.e., determined by the peculiar organisation of the given nervous system. Reflexes, like the belts of machines made by human hands, are of two kinds: the positive and the negative inhibitory, in other words, those which excite certain activities and those which inhibit them. Although investigation of these reflexes by physiologists has been under way for a long time, it is, of course, a long way from being finished. More and more new reflexes are being discovered; the properties of the receptor organs, on the surface on which it is walking. In what way does it differ, say, from inclining the head and closing the lids when something flashes near the eye? We should call the latter a defensive reflex, and the first an alimentary instinct, although in the case of the pecking, if it is caused by the sight of a stain, nothing but inclining the head and a movement of the beak occurs.

Further, it has been noted that instincts are more complex than reflexes. But there are exceedingly complex reflexes which no one designates as instincts. Take, for example, vomiting. This is a highly complex action and one that involves extraordinary co-ordination of a large number of muscles, both striated and smooth, usually employed in other functions of the organism and spread over a large area. It also involves the secretion of various glands which normally participate in quite different activities of the organism.

The fact that instincts involve a long chain of successive actions, while reflexes are, so to speak, one-storeyed, has also been regarded as a point of distinction between them. By way of example let us take the building of a nest, or of animal dwellings in general. Here, of course, we have a long chain of actions: the animal must search for the material, bring it to the site and put it together and secure it. If we regard this as reflex, we must assume that the ending of one reflex excites a new one, or, in other words, that these are chain-reflexes. But such chain activities are by no means peculiar to instincts alone. We are familiar with many reflexes which are also interlocked. Here is an instance. When we stimulate an afferent nerve, for example, the n. ischiadicus, there takes place a reflex rise of blood pressure. This is the first reflex. The high pressure in the left ventricle of the heart and in the first part of the aorta acts as a stimulus to another reflex: it stimulates the endings of the n. depressoris cordis which evokes a depressor reflex moderating the effect of the first reflex. Let us take the chain-reflex recently established by Magnus. A cat, even deprived of the cerebral hemispheres will in most cases fall on its feet when thrown from a height. How does this occur?

The change in the spatial position of the otolithic organ of the ear causes a certain reflex contraction of the muscles in the neck, which restores the animal's head to a normal position in relation to the horizon. This is the first reflex. The end of this reflex – the contraction of the muscles in the neck and the righting of the head in general – stimulates a fresh reflex on certain muscles of the trunk and limbs which come into action and, in the end, restore the animal's proper standing posture.

Yet another difference between reflexes and instincts has been assumed, namely, that instincts often depend on the internal state or condition of the organism. For instance, a bird builds its nest only in the mating season. Or, to take a simpler example, when the animal is sated, it is no longer attracted by food and stops eating. The same applies to the sexual instinct, which is connected with the age of the organism, as well as with the state of the reproductive glands. In general the hormones, products of the glands of internal secretion, are of considerable importance in this respect. But this, too, is not a peculiar property of the instincts alone. The intensity of any reflex, as well as its presence or absence, directly depends on the state of excitability of the reflex centres which in turn always depends on the chemical and physical properties of the blood (automatic stimulation of the centres) and on the interaction of different reflexes.

Finally, importance is sometimes attached to the fact that reflexes are related to the activity of separate organs, whereas instincts involve the activity of the organism as a whole, i.e., actually the whole skeleto-muscular system. However, we know from the works of Magnus and de Kleyn that standing, walking, and bodily balance in general, are reflexes.

Thus, reflexes and instincts alike are natural reactions of the organism to certain stimulating agents, and consequently there is no need to designate them by different terms. The term "reflex" is preferable, since a strictly scientific sense has been imparted to it from the very outset.

The aggregate of these reflexes constitutes the foundation of the nervous activity both in men and animals. Consequently, thorough study of all these fundamental nervous reactions of the organism it, of course, a matter of great importance. Unfortunately, as already mentioned, this is a long way from having been accomplished, especially in the case of those reflexes which are called instincts. Our knowledge of these instincts is very limited and fragmentary. We have but a rough classification of them – alimentary, self-defensive, sexual, parental and social. But almost each of these groups often includes numerous separate reflexes, some of which have not been even identified by us, while some are confused with others or, at least, they are not fully appreciated by us as to their vital importance. To what extent this subject remains unelucidated and how full it is still of gaps can be demonstrated by this example from my own experience.

Once, in the course of our experimental work which I shall describe presently, we were puzzled by the peculiar behaviour of our animal. This was a tractable dog with which we were on very friendly terms. The dog was given a rather easy assignment. It was placed in the stand and had its movements restricted only by soft loops fastened round its leys (to which at first it did not react at all). Nothing else was done except to feed it repeatedly at intervals of several minutes. At first the dog was quiet and ate willingly, but as time went on it became more and more excited: it began to struggle against the surrounding objects, tried to break loose, pawing at the floor, gnawing the supports of the stand, etc.. This ceaseless muscular exertion brought on dyspnoea and a continuous secretion of saliva; this persisted for weeks, becoming worse and worse, with the result that the dog was no longer fit for our experimental

work. This phenomenon puzzled us for a long time. We advanced many hypotheses as to the possible reason for this unusual behaviour, and although we had by then acquired sufficient knowledge of the behaviour of dogs, our efforts were in vain until it occurred to us that it might be interpreted quite simply—as the manifestation of a freedom reflex, and that the dog would not remain quiet so long as its movements were constrained. We overcame this reflex by means of another – a food reflex. We began to feed the dog only in the stand. At first it ate sparingly and steadily lost weight, but gradually it began to eat more – until it consumed the whole of its daily ration. At the same time it became quiet during the experiments; the freedom reflex was thus inhibited. It is obvious that the freedom reflex is one of the most important reflexes, or, to use a more general term, reactions of any living being. But this reflex is seldom referred to, as if it were not finally recognised. James does not enumerate it even among the special human reflexes (instincts). Without a reflex protest against restriction of an animal's movements any insignificant obstacle in its way would interfere with the performance of certain of its important functions. As we know, in some animals the freedom reflex is so strong that when placed in captivity they reject food, pine away and die.

Let us turn to another example. There is a reflex which is still insufficiently appreciated and which can be termed the investigatory reflex. I sometimes call it the "What-is-it?" reflex. It also belongs to the fundamental reflexes and is responsible for the fact that given the slightest change in the surrounding world both man and animals immediately orientate their respective receptor organs towards the agent evoking the change. The biological significance of this reflex is enormous. If the animal were not provided with this reaction, its life, one may say, would always hang by a thread. In man this reflex is highly developed, manifesting itself in the form of an inquisitiveness which gives birth to scientific thought, ensuring for us a most reliable and unrestricted orientation in the surrounding world. Still less elucidated and differentiated is the category of negative, inhibitory reflexes (instincts) induced by any strong stimuli, or even by weak but unusual stimuli. So-called animal hypnotism belongs, of course, to this category.

Thus, the fundamental nervous reactions both of man and animals are inborn in the form of reflexes. And I repeat once more that it is highly important to have a complete list of these reflexes and properly to classify them, since, as we shall see later, all the remaining nervous activity of the organism is based on these reflexes.

However, although the reflexes just described constitute the fundamental condition for the safety of the organism in the surrounding nature, they in themselves are not sufficient to ensure a lasting, stable and normal existence for the organism. This is proved by the following experiment, carried out on a dog in which the cerebral hemispheres have been extirpated. Besides the internal reflexes, such a dog retains the fundamental external reflexes. It is attracted by food; it keeps away from destructive stimuli; it displays the investigatory reflex pricking up its ears and lifting its head to sound. It possesses the freedom reflex as well, and strongly resists any attempt at capture. Nevertheless, it is an invalid and would not survive without care. Evidently something vital is missing in its nervous activity. But what? It is impossible not to see that the number of stimulating agents evoking reflex reactions in this dog has decreased considerably, that the stimuli act at a very short distance and are of a very elementary and very general character, being undifferentiated. Hence, the equilibrium of this higher organism with the environment is a wide sphere of its life has also become very elementary, limited and obviously inadequate.

Let us now revert to the simple example with which we began our investigations. When food or some unpalatable substance gets into the mouth of the animal, it evokes a secretion of saliva which moistens, dissolves and chemically alters the food, or in the case of disagreeable substances removes them and cleanses the mouth. This reflex is caused by the physical

and chemical properties of the above-mentioned substances when they come in contact with the mucous membrane of the oral cavity. However, a similar secretory reaction is produced by the same substances when placed at a distance from the dog and act on it only by appearance and smell. Moreover, even the sight of the vessel from which the dog is fed suffices to evoke salivation, and what is more, this reaction can be produced by the sight of the person who usually brings the food, even by the sound of his footsteps in the next room. All these numerous, distant, complex and delicately differentiated stimuli lose their effect irretrievably when the dog is deprived of the cerebral hemispheres; only the physical and chemical properties of substances, when they come in contact with the mucous membrane of the mouth, retain their effect. Meanwhile, the processing significance of the lost stimuli is, in normal conditions, very great. Dry food immediately encounters plenty of the required liquid; unpalatable substances, which often destroy the mucous membrane of the mouth, are removed from it by a layer of saliva rapidly diluted and so on. But their significance is still greater when they bring into action the motor component of the alimentary reflex, i.e., when the seeking of food is effected.

Here is another important example of the defensive reflex. The strong animals prey on those smaller and weaker, and the latter must inevitably perish if they begin to defend themselves only when the fangs and claws of the enemy are already in their flesh. But the situation is quite different when the defensive reaction arises at the sight and sound of the approaching foe. The weak animal has a chance of escaping by seeking cover or in flight.

What, then would be our general summing up of this difference in attitude of the normal and of the decorticated animal to the external world? What is the general mechanism of this distinction and what is its basic principle?

It is not difficult to see that in normal conditions the reactions of the organism are evoked not only by those agents of the external world that are essential for the organism, i.e., the agents that bring direct benefit or harm to the organism, but by other countless agents which are merely signals of the first agents, as demonstrated above. It is not the sight and sound of the strong animal which destroy the smaller and weaker animal, but its fangs and its claws. However, the signalling, or to use Sherrington's term, the distant stimuli, although comparatively limited in number, play a part in the afore-mentioned reflexes. The essential feature of the higher nervous activity, with which we shall be concerned and which in the higher animal is probably inherent in the cerebral hemispheres alone, is not only the action of countless signalling stimuli, rather it is the important fact that in certain conditions their physiological action changes.

In the above-mentioned salivary reaction now one particular vessel acted as a signal, now another, now one man, now another – strictly depending on the vessel that contained the food or the unpalatable substances before they were introduced in the dog's mouth, and which person brought and gave them to the dog. This, clearly, makes the machine-like activity of the organism still more precise and perfect. The environment of the animal is so infinitely complex and is so continuously in a state of flux, that the intricate and complete system of the organism has the chance of becoming equilibrated with the environment only if it is also in a corresponding state of constant flux.

Hence, the fundamental and most general activity of the cerebral hemispheres is signalling, the number of signals being infinite and the signalisation variable.

Source : from *Experimental Psychology and other essays*, 1957, published by Philosophical Library, NY. One lecture reproduced in full. **P A S**

Engels on Science and Philosophy : A Note

Ramkrishna Bhattacharya

In his formulation of the relationship between science and philosophy Engels said,

[M]odern materialism is essentially dialectic, and no longer requires the assistance of that sort of philosophy which, queen-like, pretended to rule the remaining mob of sciences. As soon as each special science is bound to make clear its position in the great totality of things and of our knowledge of things, a special science dealing with this totality is superfluous or unnecessary. That which still survives of all earlier philosophy is the science of thought and its laws – formal logic and dialectics. Everything else is subsumed in the positive science of Nature and history.¹

That this was not a brainwave or a casual remark but a well thought-out view is also borne out by the following extract :

This conception (sc. the Marxist conception of history), however, puts an end to philosophy in the realm of history, just as the dialectical conception of nature makes all natural philosophy both unnecessary and impossible. It is no longer a question anywhere of inventing interconnections out of our brain, but of discovering them in the facts. For philosophy, which has been expelled from nature and history, there remains only the realm of pure thought, so far as it is left: the theory of the laws of the thought process itself, logic and dialectics.²

The significance of this view has to be understood on several planes. First, we are still to wait for further developments in several branches of science that would enable us to arrive at such a stage. Second, philosophy has to be replaced by both science and history. Third, formal logic and dialectics would still be there when what was previously called philosophy had already been substituted by a more exact knowledge of things.

Engels' apparent rejection of philosophy has a futuristic thrust. Elsewhere too he had insisted on the special role that philosophy must play in the study of natural phenomena. Ridiculing the a-philosophical approach taken by some scientists he pointed out:

Natural scientists believe that they free themselves from philosophy by ignoring it or abusing it. They cannot, however, make any headway without thought, and for thought they need thought determinations. But they take these categories unreflectingly from the common consciousness of so-called educated persons, which is dominated by the relics of long obsolete philosophies, or from the little bit of philosophy compulsorily listened to at the University ... or from uncritical and unsystematic reading of philosophical writings of all kinds. Hence they are no less in bondage to philosophy, but unfortunately in most cases to the worst philosophy, and those who abuse philosophy most are slaves to precisely the worst vulgarized relics of the worst philosophies.³

Thus, in the middle of the nineteenth century, when epoch-making ideas were being thrown up Engels pleaded for a cross-fertilization of science with philosophy – not any philosophy, but the right kind of philosophy. He lamented the fact that his contemporary scientists knew very little about the history of philosophy and therefore missed many of the implications of the ideas found in the writings of earlier philosophers, specially the Presocratics and Aristotle. “If theoreticians are semi-initiates in the sphere of natural sciences, then natural scientists today are actually just as much so in the sphere of theory, in the sphere of what hitherto was called philosophy.”⁴ So he urged scientists to study ancient philosophy, not only to avoid repetitions but also to advance beyond empiricism. Here too he made a significant observation. In the task of bringing “the individual spheres of knowledge into the correct connection with one another”, “only theoretical thinking can be of assistance. But theoretical thinking is an innate quality only as regards natural capacity. This natural capacity must be developed, improved, and for its improvement there is as yet no other means than the study of previous philosophy.”⁵

The last sentence merits special attention. Unlike the naive egalitarianists, Engels did not believe that every scientist (let alone any man) could have the natural capacity to think theoretically. Nor did he believe that such capacity could be acquired by any thinker, even after proper training. Theoretical thinking is an innate quality: only a few can be thus gifted. Elsewhere also he remarked :

The results in which its [sc. science'] experiences are summarized are concepts, that the art of working with concepts is not involved and is also not given with ordinary everyday consciousness but requires real thought and that similarly this thought has a long empirical history, no more and no less than empirical natural science.⁶

Here too Engels pleaded for a return to early philosophy.

Only by learning to appropriate results of the development of philosophy during the past 2500 years will it [science] rid itself on the one hand of any natural philosophy standing apart from it, outside it and above it, and on the other of its own limited method of thought inherited from English empiricism.⁷

Speaking of the lag between the actual knowledge of objective facts and theoretical thinking, Engels further pointed out an apparently anomalous situation.

High as the natural science of the first half of the eighteenth century stood above Greek antiquity in knowledge and even in the shifting of its material, it stood just as deeply below Greek antiquity in theoretical mastery of this material in the general outlook of nature.⁸

How could such a thing happen? Why was there such a lag in ‘detailed knowledge’ and ‘general outlook’? How could the Greeks, knowing so little about the facts of nature, arrive at the right theoretical conclusions whereas later European thinkers and scientists had to grope in their way?

Engels offers an interesting solution. He refers to the difference between the cosmogonical ideas of the Greek philosophers and the later (Christian) scientists.

For the Greek philosophers the world was essentially something that had

emerged from chaos, something that had developed, that had come into being. For the natural scientist of the period that we are dealing with it was something ossified, something immutable, and for most of them something that had been created at one stroke. Science was deeply enmeshed in theology.⁹

The Greek philosophers had the initial advantage of starting from a premise that comes very close to the dialectical conception of nature. Thus they could formulate the right frame of reference.

And since this recognition has been reached by philosophy long before it gained effective currency in natural science, one can understand why philosophy, fully two hundred years before natural science drew the conclusions of the uncreatability and indestructibility of motion. Even the form in which it did so is still superior to the present day formulation of natural science.¹⁰

Though Engels is here speaking of a particular case – nature of motion – and that too in the context of post-Renaissance science and philosophy, the basic formulation can be applied with equal justification to the relationship between earlier philosophy and later-day science.

This also shows that Engels believed in the relative autonomy of philosophy, or theoretical thinking. A higher stage of socio-economic development does not necessarily entail progress in philosophy. The case may even be exactly the reverse. As he explains,

But as a definite sphere in the division of labour the philosophy of every epoch presupposes certain definite thought material handed down to it by its predecessors from which it takes its start. And that is why economically backward countries can still play first fiddle in philosophy¹¹

Engels’ views on science and philosophy thus open up a new field of research. We may study, for example, the philosophical ideas of early Buddhism in this light and see how the early Buddhist philosophers successfully formulated the basic concept of causality (*paticcasamuppada*) in terms of disease and cure.¹² The same holds true for the Samkhya and Nyaya-Vaisesika systems vis-à-vis Ayurveda, the Indian science of medicine.¹³

Notes And References

1. *Socialism : Utopian and Scientific*, London : George Allen & Unwin, 1925, pp. 39-40.
2. *Ludwig Feuerbach and the End of Classical German Philosophy* in Marx-Engels, *On Religion*, Moscow: Foreign Languages Publishing House, n.d., p.267
3. *Dialectics of Nature*, Moscow : Progress Publishers, 1966, pp. 209-10.
4. *Ibid.*, p.42.
5. *Ibid.*, pp. 42-43
6. *Anti-Dühring*, Peking: Foreign Languages Press, 1976, p.16.
7. *Ibid.*
8. *Dialectics of Nature*, p.25.
9. *Ibid.*
10. *Ibid.*, p. 70.
11. Letter to C. Schmidt, Oct. 27, 1890 in *Selected Correspondence*, Moscow: Foreign Languages Publishing House, n.d., p. 506.

12. I have made such an attempt to correlate the two and contrast them with the aversion to philosophy found in the Hippocratic writings of Greece, in "Medical Ethics : Ancient Greece and India", *Citi-Vithika* (Allahabad), Vol. 5, Nos. 1-2, 1999-2000, pp. 184-189, and "Science and Philosophy in Early Buddhism", *Anviksa* (Jadavpur University, Kolkata), Vol. XXIV, 2003, pp. 13-22.
13. Debiprasad Chattopadhyaya and Mrinal Kanti Gangopadhyaya have touched on these themes (See Chattopadhyaya, *History of Science and Technology in Ancient India*, Vol. II, Calcutta : Firma KLM, 1991, Ch. 8 and Gangopadhyaya, "Vaisesika Categories in the *Caraka-Samhita*" in *ibid.*, pp. 529-40) but much remains to be done, specially in relation to Samkhya. **P A S**

Marihuana, The Forbidden Medicine

Stephen Jay Gould

I am a member of a very small, very fortunate, and very select group – the first survivors of the previously incurable cancer, abdominal mesothelioma. Out treatment involved a carefully balanced mixture of all three standard modalities – surgery, radiation, and chemotherapy. Not pleasant, to be sure, but consider the alternative.

Any cancer survivor of such intensive treatment – indeed, anyone who has endured aggressive medical battles against any disease – knows firsthand the enormous importance of the "psychological factor." Now I am an old-fashioned rationalist of the most unreconstructed sort. I brook no mysticism, no romantic Southern California nonsense about the power of mind and spirit. I assume that positive attitudes and optimism have salutary effects because mental states can feed back upon the body through the immune system. In any case, I think that everyone would grant an important role to the maintenance of spirit through adversity; when the mind gives up, the body too often follows. (And if cure is not the ultimate outcome, quality of remaining life becomes, if anything, even more important.)

Nothing is more discouraging, more destructive of the possibility of such a positive attitude – and I do speak from personal experience here – than the serious side effects induced by so many treatments. Radiation and chemotherapy are often accompanied by long periods of intense and uncontrollable nausea. The mind begins to associate the agent of potential cure with the very worst aspect of the disease – for the pain and suffering of the side effects is often worse than the distress induced by the tumor itself. Once this happens, the possibility for an essential psychological boost and comfort may disappear – for the treatment seems worse than the disease itself. In other words, I am trying to say that the control of severe and long-lasting side effects in cancer treatment is not merely a question of comfort (though Lord only knows that comfort to the suffering is enough of a rationale), but an absolutely essential ingredient in the possibility of cure.

I had surgery, followed by a month of radiation, chemotherapy, more surgery, and a subsequent year of additional chemotherapy. I found that I could control the less severe nausea of radiation by conventional medicines. But when I started intravenous chemotherapy (Adriamycin), absolutely nothing in the available arsenal of antiemetics worked at all. I was miserable and came to dread the frequent treatments with an almost perverse intensity.

I had heard that marihuana often worked well against nausea. I was reluctant to try it

because I have never smoked any substance habitually (and didn't even know how to inhale). Moreover, I had tried marihuana twice (in the usual context of growing up in the sixties) and had hated it. (I am something of a Puritan on the subject of substances that, in any way, dull or alter mental states – for I value my rational mind with an academician's over-weening arrogance. I do not drink alcohol at all, and have never used drugs in any "recreational" sense.) But anything to avoid nausea and the perverse wish it induces for an end of treatment.

The rest of the story is short and sweet. Marihuana worked like a charm. I disliked the "side effect" of mental blurring (the "main effect" for recreational users), but the sheer bliss of not experiencing nausea – and then not having to fear it for all the days intervening between treatments – was the greatest boost I received in all my year of treatment, and surely had a most important effect upon my eventual cure. It is beyond my comprehension – and I fancy I am able to comprehend a lot, including much nonsense – that any humane person would withhold such a beneficial substance from people in such great need simply because others use it for different purposes.

[Stephen Jay Gould, In Lester Grinspoon, ed., *Marihuana, The Forbidden Medicine*, New Haven : Yale University Press, 1993, 39-41.] **P A S**

Donald E. Brown's List of Human Universals

This List, Compiled in 1989 and published in 1991, consists primarily of "surface" universals of behavior and overt language noted by ethnographers. It does not list deeper universals of mental structure that are revealed by theory and experiments. It also omits near-universals (traits that most, but not all, cultures show) and conditional universals ("If a culture has trait A, it always has trait B"). A list of items added since 1989 is provided at the end. For discussion and references, see Brown's *Human Universals* (1991) and his entry for "human Universals" in *The MIT Encyclopedia of the Cognitive Sciences* (Wilson & Keil, 1999).

□ abstraction in speech and thought □ actions under self-control distinguished from those not under control □ aesthetics □ affection expressed and felt □ age grades □ age statuses □ age terms □ ambivalence □ anthropomorphization □ antonyms □ baby talk □ belief in supernatural/religion □ beliefs, false □ beliefs about death □ beliefs about disease □ beliefs about fortune and misfortune □ binary cognitive distinctions □ biological mother and social mother normally the same person □ black (color term) □ body adornment □ childbirth customs □ childcare □ childhood fears □ childhood fear of loud noises □ childhood fear of strangers □ choice making (choosing alternatives) □ classification □ classification of age □ classification of behavioral propensities □ classification of body parts □ classification of colors □ classification of fauna □ classification of flora □ classification of inner states □ classification of kin □ classification of sex □ classification of space □ classification of weather conditions □ coalitions □ collective identities □ conflict □ conflict, consultation to deal with □ conflict, means of dealing with □ conflict, mediation of □ conjectural reasoning □ containers □ continua (ordering as cognitive pattern) □ contrasting marked and nonmarked sememes (meaningful elements in language) □ cooking □ cooperation □ cooperative labor □ copulation normally conducted in privacy □ corporate (perpetual) statuses □ coyness display □ crying □ cultural variability □ culture □ culture / nature distinction □ customary greetings □ daily routines □ dance □ death rituals □

decision making □ decision making, collective □ directions, giving of □ discrepancies between speech, thought, and action □ dispersed groups □ distinguishing right and wrong □ diurnality □ divination □ division of labour □ division of labor by age □ division of labor by sex □ dreams □ dream interpretation □ economic inequalities □ economic inequalities, consciousness of □ emotions □ empathy □ entification (treating patterns and relations as things) □ environment, adjustments to □ envy □ envy, symbolic means of coping with □ ethnocentrism □ etiquette □ explanation □ face (word for) □ facial communication □ facial expression of anger □ facial expression of contempt □ facial expression of disgust □ facial expression of fear □ facial expression of happiness □ facial expression of sadness □ facial expression of surprise □ facial expressions, masking/modifying of □ family (or household) □ father and mother, separate kin terms for □ fears □ fears, ability to overcome some □ feasting □ females do more direct childcare □ figurative speech □ fire □ folklore □ food preferences □ food sharing □ future, attempts to predict □ generosity admired □ gestures □ gift giving □ good and bad distinguished □ gossip □ government □ grammar □ group living □ groups that are not based on family □ hairstyles □ hand (word for) □ healing the sick (or attempting to) □ hospitality □ hygienic care □ identity, collective □ incest between mother and son unthinkable or tabooed □ incest, prevention or avoidance □ in-group distinguished from out-group (s) □ in-group, biases in favor of □ inheritance rules □ insulting □ intention □ interest in bioforms (living things or things that resemble them) □ interpreting behavior □ intertwining (e.g., weaving) □ jokes □ kin, close distinguished from distant □ kin groups □ kin terms translatable by basic relations of procreation □ kinship statuses language □ language employed to manipulate others □ language employed to misinform or mislead □ language is translatable □ language not a simple reflection of reality □ language, prestige from proficient use of □ law (rights and obligations) □ law (rules of membership) □ leaders □ lever □ linguistic redundancy □ logical notions of “and” □ logical notion of “equivalent” □ logical notion of “general/particular” □ logical notion of “not” □ logical notion of “opposite” □ logical notion of “part/whole” □ logical notion of “same” □ magic □ magic to increase life □ magic to sustain life □ magic to win love □ male and female and adult and child seen as having different natures □ males dominate public/political realm □ males more aggressive □ males more prone to lethal violence □ males more prone to theft □ manipulate social relations □ marking at phonemic, syntactic, and lexical levels □ marriage □ materialism □ meal times □ meaning, most units of are non-universal □ measuring □ medicine □ melody □ memory □ metaphor □ metonym □ mood-or consciousness altering techniques and/or substances □ morphemes □ mother normally has consort during child-rearing years □ mourning □ murder proscribed □ music □ music, children’s □ music related in part to religious activity □ music seen as art (a creation) □ music, vocal □ music, vocal, includes speech forms □ musical redundancy □ musical repetition □ musical variation □ myths □ narrative □ nomenclature (perhaps the same as classification) □ nonbodily decorative art □ normal distinguished from abnormal states □ nouns □ numerals (counting) □ Oedipus complex □ oligarchy (de facto) □ one (numeral) □ onomatopoeia □ overestimating objectivity of thought □ pain □ past/present/future □ person, concept of □ persons names □ phonemes defined by sets of minimally contrasting features □ phonemes, merging of □ phonemes, range from 10 to 70 in number □ phonemic change, in inevitability of □ phonemic change, rules of □ phonemic system □ planning □ planning for future □ play □ play to perfect skills □ poetigline, uniform length range □ poetic lines characterized by repetition and variation □ poetic lines demarcated by pauses □ polysemy (one word has several related meanings) □ possessive, intimate □ possessive, loose □ practice to improve

skills □ preference for own children and close kin (nepotism) □ prestige inequalities □ private inner life □ promise □ pronouns □ pronouns, minimum two numbers □ pronouns, minimum three persons □ proper names □ property □ psychological defense mechanisms □ rape □ rape proscribed □ reciprocal exchanges (of labor, goods, or services) □ reciprocity, negative (revenge, retaliation) □ reciprocity, positive □ recognition of individuals by face □ redress of wrongs □ rhythm □ right-handedness as population norm □ rites of passage □ rituals □ role and personality seen in dynamic interrelationship (i.e., departures from role can be explained in terms of individual personality) □ sanctions □ sanctions for crimes against the collectivity □ sanctions include removal from the social unit □ self distinguished from other □ self as neither wholly passive nor wholly autonomous □ self as subject and object □ self is responsible □ semantics □ semantic category of affecting things and people □ semantic category of dimension □ semantic category of giving □ semantic category of location □ semantic category of motion □ semantic category of speed □ semantic category of other physical properties □ semantic components □ semantic components, generation □ semantic components, sex □ sememes, commonly used ones are short, infrequently used ones are longer □ senses unified □ sex (gender) terminology is fundamentally binary □ sex statuses □ sexual attraction □ sexual attractiveness □ sexual jealousy □ sexual modesty □ sexual regulation □ sexual regulation includes incest prevention □ sexuality as focus of interest □ shelter □ sickness and death seen as related □ snakes, wariness around □ social structure □ socialization □ socialization expected from senior kin □ socialization includes toilet training □ spear □ special speech for special occasions □ statuses and roles □ statuses, ascribed and achieved □ statuses distinguished from individuals □ statuses on other than sex, age, or kinship bases □ stop/nonstop contrasts (in speech sounds) □ succession □ sweets preferred □ symbolism □ symbolic speech □ synonyms □ taboos □ tabooed foods □ tabooed utterances □ taxonomy □ territoriality □ time □ time, cyclicity of □ tools □ tool dependency □ tool making □ tools for cutting □ tools to make tools □ tools patterned culturally □ tools, permanent □ tools for pounding □ trade □ triangular awareness (assessing relationships among the self and two other people) □ true and false distinguished □ turn-taking □ two (numeral) □ tying material (i.e., something like string) □ units of time □ verbs □ violence, some forms of proscribed □ visiting □ vocalic/nonvocalic contrasts in phonemes □ vowel contrasts □ weaning □ weapons □ weather control (attempts to) □ white (color term) □ worldview.

Additions Since 1989

□ anticipation □ attachment □ critical learning periods □ differential valuations □ dominance/submission □ fairness (equity), concept of □ fear of death □ habituation □ hope □ husband older than wife on average □ imagery □ institutions (organized co-activities) □ intention □ interpolation □ judging others □ likes and dislikes □ making comparisons □ males, on average, travel greater distances over lifetime □ males engage in more coalitional violence □ mental maps □ mentaless □ moral sentiments, limited effective range of □ precedence, concept of (that’s how the leopard got its sopts) □ pretend play □ pride □ proverbs, sayings □ proverbs, sayings – in mutually contradictory forms □ resistance to abuse of power, to dominance □ risk taking □ self-control □ self-image, awareness of (concern for what others think) □ self-image, manipulation of □ self-image, wanted to be positive □ sex differences in spatial cognition and behavior □ shame □ stinginess, disapproval of □ sucking wounds □ synesthetic metaphors □ thumb sucking □ tickling □ toys, playthings

Alcoholism : a problem of all times

Dhirendranath Gangopadhyay

Although worshipping the wine-gods Bacchus & Dionysus like the Greeks & the Romans was not in vogue in every country; alcoholic beverages used to be produced almost in all countries, & drinking wine had been more or less always prevalent within every race & tribe. Drinking used to be considered as a part of the function in numerous religious & social festivals. At any point of time an addiction towards this beverage used to grow within a few people in the society, & due to their anti-social behaviour & chaotic conduct an anti-drinking mentality could be noticed among some people in the society almost in all ages & countries. So it can be said that alcoholism is a problem of all times.

Definition of alcoholism

No uniformity in the opinions of the scholars about who should be called alcoholic has been established yet. There is no likeness between the opinions of World Health Organization & that of American Medical Association. Again many specialists have decided the definition according to their likings. In the text book of psychiatry mental perversion has been given importance in case of addiction of chronic alcoholic, yet again the veterans of Sociology have looked at the social wear & tear largely. However all are almost unanimous in some overall issues that alcoholism makes behavioural disorder happen; the mind of an alcoholic almost always remains clouded with the thought of the wine-god, the addict's body & mind grow restless to drink at the specific time, an indomitable desire induce him to drinking; no thought dealing with the loss of wealth & health & of himself & the relatives does get place inside the alcoholic's mind.

Result of drinking

What kind of joy does drinking give compared to which every other thing appears to be trivial? Many poets have occasionally said certain things in praise of the wine-gods that perhaps still influence people. Horace had written in the first century B.C : It discloses secrets, ratifies & confirms our hope, thrusts the cowards forth to battle, releases the anxious mind of its burden, ... perhaps he had said these words under the influence of alcohol, but there is at least a partial external truth in whatever he had spoken of. One may feel alike after first one or two gulps of wine, & probably that's why I feel no scarcity of wine-drinkers is taking place in any country at any time. Roman poet Horace probably didn't know that much before his birth a king of Persia getting inebriated took thousands & thousands of lives without any reason; in order to try whether his ability of aiming is uninterrupted even after drinking he pierced his friend's son with arrow, the story of this Prsian King Cambuses' alcoholism has been historically famous. The Yadavs had been provoked into a self-destructing madness as a result of drinking in groups at Pravash pilgrimage.

Leaving the talk of the past if we arrive at present we notice that an alcoholic only harms his family & the society – this opinion is supported by most of the researches. Bengeldoroff wrote : ... Its abuse has killed more people, sent more victims to hospitals, generated more police arrests, broken up more marriage & homes & has cost industry more money than has

the abuse of heroin, amphetamines, barbiturates & marijuana combined (*Los Angels Times*, March 1970). Not only in America, in the literature of many countries the bitter print of drinking has been captured in the stories dealing with drunkards. Many dramas have been written, even a couple of anti-drinking public dramas have been judged as good literature. Drinking prevention committee & the governments of many countries have occasionally made laws blaming drinking. As a result unlawful brewing factories have increased, but drinking couldn't be stopped. In order to repeal the delusion of the common man now-a-days the physicians have been opining almost unanimously that, no matter what poetry Omar Khayum had created about wine, there is no favourable result of drinking to speak of. There may be no harm in drinking wine in a small amount or occasionally by one once, a temporary feel of tension release may also show up; but there is no doubt in this matter that alcohol is harmful for the body even at smaller quantities.

Let me tell you about the bitter result of alcoholism in short now. One in every ten alcoholics suffer from the diseases of liver. We see intestinal wound, cirrhosis of liver happening in many alcoholics. Moreover due to the passivity of the brain cells delirium & insanity show up. In most of the cases deterioration of the moral character & reasoning occurs. Many get dismissed from the job due to the lack of efficiency, they don't hold even the ability of doing new work.

The end result of alcoholism is even more pathetic & dreadful! We have come to know from an American statistics that 508 deaths have occurred due to alcoholism. In that country a primary reason for suicides too is alcoholism. Moreover towards the final years the signs of insanity are manifested in alcoholics. Different kinds of symptoms of insanity viz. visual & auditory hallucination, delusion etc. are often noticed among the drunkards. I have earlier mentioned about the error of memory. In this disease (Korsakoff's syndrome) coined according to the name of scientist Korsakoff, the patient fails to remember anything as old as three or four years since the beginning of the disease.

Quite a number of people among the alcoholics are educated. Perhaps they know about these information, yet they don't want to overcome the addiction or fail to do so. Yet poems about wine are composed the wine-godess is worshipped in different ways. Is the misconception prevalent about wine, the reason for that?

Misconception

There are still certain misconceptions prevalent among the public about wine.

(1) Many think that wine is as if stimulating, so they drink it. Actually as a result of drinking wine the upper layer of the brain (which is known as cerebrum) loses strength resulting in the stimulation of the lower layer (which we call cerebellum). On getting devoid of reasoning for a short period, the unreasoning drunkard, under the influence of intoxication, can perform desperate acts of bravery or anti-social activities. But gradually the loss of strength spreads throughout the entire brain; so one loses the least ability of doing work, the whole body becomes exhausted & gets overwhelmed with sleep.

2) Many consider wine as an essential ingredient for the pleasure attached with a woman's company. There was a time when in this country drinking was considered as an accompanying function alongwith the joy pertaining to the proscribed area or a cottage garden. Wine was considered to be an aphrodisiac, drinking increases the sex-drive. It is a deadly mistake to drink wine as a sexual-urge-increasing tonic; wine is not at all an aphrodisiac. Alcohol may inspire an individual into abnormal & illegitimate sexual relationship by dampening the reason-

ing ability, ethics & sense of beautifying; alcohol may help in establishing sexual relationship devoid of love bondings, by temporarily increasing biological lust; let alone the idea of increasing the capacity for enjoyment, as a result of drinking regularly the sex-drive falls, gradually decreases & eventually may become completely extinct. As a result of the decreasing sex-drive in certain cases sex-based 'Delusion of Sex-jealousy' may arise in the minds of the alcoholics. I have read in a doctor's report that an 'addict' recognizing his wife's effort to stop his drinking as a cogent proof of her affinity towards other men, had reported to the police of adultery against his wife & a 18 year old boy of the neighbouring flat. A few years ago an alcoholic known to me, under the subjugation of a similar suspicion had taken refuge in a hotel after beating up his wife & leaving home. According to me, alcohol doesn't increase any capability. It makes the biological instinct stronger & a human being inhuman.

(3) Alcoholism makes a human being social – this type of an idea is quite prevalent. As a result of considering alcohol as a 'communication medium', now-a-days in our country too business agreements & transactions are generally accomplished at the very wine-serving table in some 'five star' hotel. Does drinking actually make a person more sociable? A couple of sociologists as a matter of fact believe so. They say that the opportunity of intimately mixing up is fewer in the modern city-civilization; we remain unknown to each other in spite of living at neighbouring flat; we go to & fro through the same streets, we can recognize each other's face; but we don't make acquaintance. The opportunity that was there at the village worshiping-ground, the pond-side, & at the river ghats for unbounded exchange of expressions, is scarce in the city-life. We can not speak out our heart's contents putting off the mask of citizen-friendly courtesy. We are shut up within ourselves. The appropriate place for the alleviation of this 'tension' & the mitigation of this separation is the wine-shop & bar restaurant in the city. We remove this 'tension' by becoming unabashed to our known ones, & calling the unknown ones to our table while drinking.

Apparently this statement possibly seems to be correct. We all are more or less oppressed by loneliness. As if seclusion & self-centredness get alleviated on coming to a bar. But on mindfully listening to the discussions of the wine-drinkers for a while it would be evident that they are talking indeed but are not listening to others. The accumulated words are losing weight but the weight on the chest is not decreasing. They are displaying their 'ego' but not disclosing their 'entity'.

Psychological Reason

Many people drink wine, but not all become an addict. I don't think that we have been able to know from any of the countries the correct number of the alcoholics. It can be said roughly that only five percent of the drunkards become addict. According to a statistics published a few years back in American journal the number of total drunkards was eight crores. It is not possible to determine the number of alcoholics from the number of those who be at the door of the physicians or hospitals for treatment. In our country 'illegal distillation' is so widespread that it is not possible to determine the number of drunkards from the sales tax or 'excise duty' of alcoholic beverages. But everybody think that the number of alcoholics & addicts is growing & that alcoholism & addiction should be considered as a social problem. Many still disagree to consider alcoholism as a disease. The effect of alcohol varies from person to person & from time to time; so any equalization is not easy in this regard. Drinking is considered as a 'status symbol' among the higher middle classes especially who are the carriers of the western civilization, therefore drinking can not be considered quite as an ethical offence.

Unlike other countries an active social or religious organization to prevent drinking has not been quite built up here. The branches of a couple of international organizations are there in our country, but we seldom get to see any report dealing with their activities. The popularity of famous artist-literateur remains intact even if they drink openly at a public thoroughfare. It's not true that the number of alcoholics are increasing only for these reasons. We have to go a little deeper in order to determine the reason of growing addiction.

Alcoholics can be roughly divided into two categories. There is this group who on getting any particular mental trauma or in order to overcome the fear or shyness in any matter had initially taken refuge in alcohol & having got some partial & temporary result gradually became addict. They have led a roughly unperturbed life during childhood & adolescence, have gained social success, & have probably hated drunkards. These people on becoming addicts consider themselves guilty, try to keep the issue of their addiction in secrecy & become isolated from their old friends. Consequently the need for the help of alcohol grows even stronger & gradually their familial life becomes unbearable. A few of them solve their problem by eventually committing suicide. I am going to relate the history of a couple of persons of this type.

a) Mr. 'A' is the son of a family of Vaishya Saha of East Bengal. At the age of 22-23 he felt deep love for the sister of a Brahmin friend. He was a distinguished student of the University; he was quite interested about the external world & was not used to any kind of addiction. His intimate friends used to quite respect him. They could never venture to cut obscene jokes before him. Even the friends habituated in cigarettes never smoked before him. Mr. 'A' didn't let her, whom he was in love with, know anything. In those days (I am talking about the time 50 years back) this type of wooing was not in vogue in a middle-class society. In spite of the fact that this object of affection was a Brahmin by caste Mr. 'A' perceived that his parents would give their consent in this marriage. He was progressive verbally. He didn't agree with the marriage proposal. Henceforth Mr. 'A' became a drunkard. Within a year his daily dose of drinking rose from a peg to a bottle. Within a few days he committed suicide by drinking alcohol alongwith sleeping pills. His friends got no result even after forcibly taking him to a contemporary very famous psychiatrist.

(b) Mr. 'B' is a trade-union leader of an industrial city. He is very famous, very influential. He used to occasionally drink just a little but had no addiction. This fact was known to the bosses of his party. Once he had a strong difference of opinion with his party regarding a matter & he severely criticized the party leaders. The central directors of the party undertook punitive measure against him under the accusation of drinking in an open place. With an offended state of mind he resigns from the party membership, & joins the opposition party. Thereafter the limit of his drinking kept on increasing, within a few months he kept on drinking excessively in open public thoroughfares & in front of his children at home. Within a couple of years he got marked as an addict to all known or unknown. His addiction kept on growing in spite of financial insolvency, dysfunction of liver, wife's lamentation, scolding, friends' compassion, good advice & loss of dignity.

Those who come under the second group of addicts show up delirium, behavioural abnormality & personality disorder. They fail to properly cope up at home or in school. At the very first sight they become followers of the wine-god. These people don't have any special on-the-spot reason for drinking. One may guess from their behaviour & movement that they are as if determined for self-destruction. They don't want to keep drinking in secrecy, they can be identified without any difficulty at all. They themselves don't try for treatment or giving up alcohol. In some cases although their friends & relatives forcibly sent them to a doctor, they

don't follow the physician's directives. Mainly these very addicts create problem & they are the real headaches of the society. If drinking is prohibited by making law these people will rightly collect their quota. Even now they don't face difficulty at all in getting alcohol if all the wine-shops get closed. Starting from juvenile delinquent & big 'criminal' to even a couple of talented artists literateurs journalists could be seen among them. I am putting up here the context of a couple of persons of this type.

(c) Mr 'C' writes poems. He perceives that he is not getting that much respect from the society which he should deserve. In our country writing poems doesn't earn much money; he depends on his wife's income. Otherwise he is very friendly, reserved, polite & gentle. But his demeanour changes after gulping down a couple of pegs. He keeps on talking continuously like a poetry. I am exhibiting here a couple of pieces of his dialogue. "Why do I drink? My mrs. has completely changed after having the child, teasing me has become her habit. No, I don't feel jealous at the child, not exactly jealousy, a 'sense of loneliness', do you know what do I feel like? As if I am the last rays of the setting sun adjacent to the peak of the high mountain; I would disappear instantly."

Another day's account : Why do people drink? The subject is quite intricate. Have you listened to Bageshree at the dead of night? From above the solar system an unknown ray is approaching to meet with you. Waves have risen in the Space. Your body is gradually melting down, just as a waxed doll melts down. You are looking around for shelter. The earth beneath your feet is moving to & fro. What can you do then? I can not think about anything other than pouring alcohol down the throat & creeping back to my den. There is a print of this kind of cosmic alienation in the poems of Mr. 'C'. His childhood-adolescence has been spent through extreme uncertainty. He has not received the love & affection of a mother, has failed in the endeavour of finding out a mother inside his wife, consequently this alienation has shown up in him & the limit of his drinking is rising.

(d) Mr. 'D' has grown up like a weed within a big joint family. Having poured down the aristocracy of a decaying Zamindar lineage on his bosom he has become a partner in the struggle of the proletariat. The over-sensitiveness of his artistic mind had made him sympathetic & compassionate. But whenever he tried to bring himself down to the level of the ordinary his aristocrat mentality used to revolt; but his egotism used to get hurt. He used to try to forget the pain of that wound by pouring country liquor & toddy down his throat. He didn't admit any of the bondings related to the worldly affairs or the society. On failing to match the formula of public movement with the revolting 'Bohemian' mentality he became nonplussed, miserable & gradually got alienated from everybody else. In one hand he used to consider himself a more higher-off individual than his colleagues on the other hand at times he used to think of himself as an unsubstantial artificial revolutionary & miserable than everybody else. Under these circumstances he used to gulp down a lot of cheap liquor & fought with his friends & relatives. He used to say that there is the bacillus of alcoholism in his blood. He has seen his father & uncle too holding a glass of wine in the hand & puffing up in the glory of past wealth. With financial insolvency & a broken health he failed even towards his end to let go off the vanity of wine. When I had seen him, even then alcohol was essential for him to keep alive the tremendous egotism & self-awareness inside of him.

We can not develop any generalized theory from the mentality of these two alcoholics. We can only say that these people had tried to somehow patch up & set their incomplete & divided personality upright with the help of alcohol. Perhaps they became assured on receiving some sort of self-satisfaction initially through drinking. On experimenting with cats Masserman

had noticed that those cats who are made to suffer from experimental neurosis, get some relief by drinking alcohol & later on leaving milk & fish become addicted to alcohol. A specialist has commented : "The fact that alcohol pharmacologically is a cortical depressant which offers a blurring of anxiety-creating apperceptions & can provide prolonged tension-release in addition ... behaviour is more powerfully controlled by its immediation rather than delayed consequences, & it is precisely for this reason that persons may persistently engage in immediately reinforcing but potentially self destructive behaviour." (Bandura, *Principles of Behavior Modifier*, New York 1969 : P. 630)

The psychological reason behind the self-destructive behaviour of the 'alcoholics', the mystery of giving indulgence to addiction although knowing that it may harm the self, can become largely comprehensible from these two quotations. One can not remove their addiction only by making 'alcohol' unavailable & not causing their mentality to change. Moreover as a result of this their physical & mental wear & tear may grow even bigger. I don't think that it has been correctly determined till now which mentality type is alcoholism-friendly. The founder of 'National Council On Alcoholism' in America Martyman thinks that an elemental difference in mentality between any two persons exists; so provoking addiction among the non-addicted 'teetotallers' is as difficult as deaddicting the alcoholics.

Sociological Reason

A clear conception about alcoholism can not grow up if an individual-psychologist assigns importance on the reasons. One should also become aware of the social & cultural reasons. In this context Horton's work (1943) should be mentioned. On carrying out experiments among 56 primitive races he had reached the conclusion :The greater the insecurity or anxiety level of the culture, the greater the amount of alcohol consumption... due allowance having been made for the availability of alcohol. Amusingly enough there is no hard & fast rule that the number of the alcoholics would be greater in that society where alcoholism is socially granted. Although in Italy & Israel drinking is a socially granted custom, the number of alcoholics is lesser in these two countries & 'alcoholism' is not a problem there. Again in France this problem is considered to be more serious than that in America. Twelve percent of the population is drunkard there; among them the number of children is quite high. The remark of *Time magazine* (April 22, 1974) about Soviet Union is that the impact of the vodka-monster at the root of 60 percent of adult crimes like murders is acknowledged there. We have no comparative statistics with us in this matter, but I can say from a few days old experience that we almost don't get to see drunkards in the streets now-a-days. Besides that, alcoholic beverages are served in some very rare cases for attending the guests now-a-days. In our country at present drinking is reproachable in the middle-class society; yet on the streets & open public thoroughfares we often get to see drunkards appearing. I stay over the main road. I almost regularly watch the lasciviousness of the local & outside drunkards after 10 p.m. They speak on abusive language recklessly at a high-pitched voice. The young ones at home are compelled to hear that conversation facing downwards in front of others. Just like America in our country also the number of drunkards among the young ones are increasing. In America parents feel jeopardized on knowing that their young son is taking 'drugs', & punishes him; but they don't become that anxious on knowing that he has got drunked. Because in their family & society drinking is not prohibited or blamable.

Many sociologists guess social disorder & alienation as the reason for rising alcoholism. As a result of larger devastation in the culture of the American Indians & the Eskimos as

compared to other racial cultures in the United States, the number of the alcoholics has considerably increased among them. Although there is no proper statistics one may guess from the revenue collected through the sales of alcohol that the public groups or races in which cultural-crisis is prominent, contain more drunkards. If the individual or the group is deprived of the traditional everyday affairs or cultural ingredients, if the outside world or society fails to supply the stimuli, then one is compelled to try to invigorate the nervous system with the stimulus of a bottle at the end of the day or on a holiday. Drinking is censurable in Judaism & Islam & the impact of other cultures not being much in their religious culture the number of alcoholics in these two communities is comparatively lesser. One gets to hear that when the Jews face any difficult problem their addiction towards worshipping goes up. There is a Japanese proverb which when translated into English says : First the man takes a drink, then the drink takes the man.

Treatment & Preventive Measure

A lot of research & experimentation have been done regarding the treatment & preventive measure of alcoholism. I don't think that any arrangement has been considered successful & effective as yet. As the reason for alcoholism varies from person to person & from group to group, different types of treatment & preventive measures are prevalent there. Certain physicians assign importance to genetic contagion. A psychiatrist of the Washington University has said that - the possibility of being alcoholic is four times more for the children of a drunkard father, compared to other. Although many don't give their consent to this theory, there are certain physicians who maintain this opinion that perhaps it would not work if any gene-based explanation of alcoholism is only found out & chased away one day. (We are trying to exorcise a devil, but there is no one devil, there is a host of demons). Only the United States has a centre for treatment; their method of treatment is not a uniform one. Even a short time back the physicians used to avoid them. The alcoholics are suffering from a mental leprosy, treating them wouldn't yield any result this was the specialists' idea. Although at present the mentality is not that stringent the physicians for treating psychiatric diseases are still not much interested in treating the alcoholics. This type of mentality has possibly grown out in the physicians as a result of not getting any special result in the Freudian psychoanalysis. However recently, instead of this mentality suggestive of depression we are getting to hear some notes of hope from the mouth of many specialists. It's true that nobody is claiming for a 'surecure', but the substance of the one or more than one methods of treatment is to alleviate the loneliness felt by the alcoholics. Most of the institutions for treatment have built up aiming at 'group therapy'. Among these institutions 'Alcoholics Anonymous' is the oldest & extremely worthy international institution. Many physicians admit that the success of this organization devoid of the leadership by the physicians & the specialists, is higher than the clinics directed by the specialists. They have around ten lakh members in America alone. In the physician's clinic basically aversion instead of addiction is created (aversion therapy).

An aversion towards the taste & odour of alcohol is created in the alcoholic's mind by making him drink followed by the intake of nausea-causing drug. Besides that fear & abomination about drinking can be produced in the alcoholic's mind with the help of suggestion under a hypnotic state. In many cases it is possible to remove the habit of drinking by stimulating the brain with any painful stimulant (electric shock) alongwith drinking. In those cases where the habit of drinking is due to mental agony, a scientific discussion dealing with life, society & the individual is required there to alleviate the langour of defeat in the war of life. All in all,

I can say from my experience as a physician that if the patient is indeed eager to give up the habit of drinking & if the relatives help him, then in many cases getting success in the treatment of alcoholism becomes possible. However during the treatment the alcoholic could be kept in such an environment for at least 10-12 weeks, where there remains no possibility for him to collect any alcoholic beverage. It should be remembered that the number of psychiatrists & mental hospitals is nothing compared to what is required. It is not possible to stop drinking only by making laws.

It is not possible for the government of any country to stop illegal distillation. Some people feel rather more attraction towards prohibited works. Moreover the possibility of the loss of health & lives would far increase with the intake of illegal distilled liquor. Has the number of smokers really gone down in spite of the warning about the evil effect of smoking in the cigarette packs & advertisements? The laws to stop addiction may turn to a farce if more information about why people get addicted is not gathered. More research & discussion is needed about the relation of an individual's sense of alienation & insecurity with taking alcohol & drugs. Perhaps we still don't know properly that a human being gives in before addiction for which physiological & psychological reason. [Written in July 1972] **P A S**

From the desk of the Monochitrak

Abantika has got problem with her father. Initially he too started forgetting. The signs started manifesting after a year or so of the retirement. If somebody asks, 'what have you eaten this morning?' He says, 'I eat milk with beaten rice everyday.' If pressurized to tell specifically what he has eaten today, he gets to laughing after looking at his daughter, 'please tell him! Don't I eat milk with beaten rice?'

On being asked where he used to do service he said, 'I work in the Rails.' 'Did you say, I work? Do you still work?' He said smiling, 'yes, sometimes I cannot go for my health.' He was sixtyeight.

I looked at his daughter's face. She said, "There it is, you see, this disease has recently caught up with him. Ten years have passed since he retired. He has started saying for the past few days that he will go to work. Immediately after getting up in the morning and dressing up he wishes to go out to work."

I asked, "When did you retire?"

He kept on smiling, "No no, its not me, it's Sanyal, Sanyal has retired."

Generally in this disease the patient doesn't consider the loss of memory as a problem. He even doesn't want to inform it to others. Rather he feels hesitation for failing to remember. He wants to avoid the matter by laughing it away. He doesn't understand that it's not his fault, so in spite of being innocent he suffers considering himself as guilty. But that's only for a few days. Thereafter this disease doesn't stay only at the threshold of the loss of memory. Due to the largescale loss of memory the judgement and rationality start to become extinct; because all of it stands on the pillar of memory. Abantika got into trouble with her father - having one out in the streets he started looking blankly at the women of all ages. He started to give a gushing smile, altogether like a stupid, on seeing women. A social problem with her father appeared. People came complaining to the house. He got beaten up by the street-public for a couple of times or so. Abantika was thrown into confusion at this downfall of her father.

But she was astonished to see no sense of guilt inside her father about this matter. If he is rebuked in this regard he simply smiles and says, 'It's nothing.'

But father was an ideal to the daughter. The daughter knew nothing without her father.

The blow came by more lethally, when father started to manhandle and gripe, not the women in the street, but mother at the very sight of her, like an animal altogether. Abantika's mother started to stay behind closed doors. Father attempted to break the doors. He simply smiles with an embarrassed face when the daughter comes before him.

Abantika wept before me while narrating, " ... I can not imagine father in such a way, how oddly like an animal he looks with a greedy face at my mother and stretches out his hands towards her. During my childhood I used to fall asleep in the lap of this very father while listening to songs. He used to bring me to school holding my hand. How bad he felt after keeping me back at the college's hostel, he used to get restless on not receiving at least one letter from his daughter. Doctor! I am fearing that, there is only me left among the women in this world towards whom father doesn't stretch out his hands in that way. But if" Abantika fails to continue any more.

" No, there is no certainty, he can stretch out his hands even towards you."

This time Abantika broke down in tears - there was no more closer to the father than the daughter.

I consoled. I asked her to be steady. I also asked her to try to make out the issue as a mature and experienced person. Father will not get judgement, if the daughter simply drifts away in emotion. The father will get the right judgement before a mature and considerate mind of the daughter.

"We call the disease, that your father has dementia. This disease shows up towards the higher end of the age in some. Sometimes it remains confined within a little weakness of memory, sometimes it doesn't. What has happened in case of your father, the nerve cells are fast going atrophy and it is irreversible. There is no way to bring back or replace a atrophied neuron to previous condition. As a result of atrophy of neurons of cerebral cortex, the higher nervous functions such as judgement, intelligence, memory, emotion become disordered, resulting in the relessnessness of the animal-like emotions and behaviours of the lower cortex which remain under the control of the former.

You are seeing your father in his outer shell. In fact it's a shell only. In the inner brain where your father was captured, the brain that knew you, as his daughter, loved you, called you with affection as 'Abantika', is no more inside. He has slowly disappeared. The animal-like inner part has got unreasonably got punishment from this society. This man is no more your father in that sense, only a left over of his unconditional reflexes residue. If you break down, that would do injustice to your father, the person who has already left you."

Abantika kept on looking vacantly at me with an aimless vision and with a sentimental, doubtful and bewildering face. Dr. Goutam Bandyopadhyay. **P A S**

Question-answer on Pavlov

Many a time our workers of this Institute demand for a brief summarised version of the scientific works of Pavlov for non-specialist educated people. Essentially to meet their demand this question-answer form (catechism) on Pavlov has been prepared and hereby published.

1. Who was Pavlov?

A: Ivan Petrovich Pavlov (1849-1936) was the greatest physiologist of Soviet Russia who had own the Nobel Prize in the year 1904 on Physiology and Medicine for his research works on digestive system.

2. For which scientific works he is being remembered?

A: He discovered 'Conditioned Reflex' mechanism of central nervous system for which he is known to us; but there are many fields of study of human science where his scientific works have been considered as seminal research such as psychology, psychiatry, education, anthropology, management, philosophy, methodology etc..

3. What is the relation of Pavlov's works with psychology?

A: Pavlov founded a new science, the physiology of the higher nervous activity, primarily concerned with the functioning of the cerebral cortex, as the organ of mental life. Pavlov's materialistic approach to mental activity, which was outraged by the idealist basis of meta-physical psychology, was study of the higher nervous process of material events existing in space-time.

Contemporary psychology was concerned with purely spiritual phenomena having no relation to space and only the faintest connection with time. All Pavlov's experiments with conditioned reflexes were studies of space relations taking time to develop. He was concerned with the discovery of the nerve paths along which excitation moves, concentrates, or is inhibited. His main thesis is that mental activity is higher nervous activity; that without material motion of nerve impulses, there is no mental life.

4. What is the relation of Pavlov's works with psychiatry?

A: Pavlov through his clinical work with mental patients, generalized that nervous tissues are highly sensitive, reactive and delicate part of the body. There is of necessity a nervous mechanism for the protection of these vital vulnerable cells. Pavlov called this mechanism *protective inhibition* and he further postulated that localized protective inhibition accounts for many kinds of neuroses and psychoses, from very mild to extremely severe cases.

Pavlov concluded that a number of those forms of functional mental illness, in which generalized or localized protective inhibition played a leading role, could be improved, relieved or cured through heightening the protective inhibition by means of various drugs in proper dosage and hypnotic suggestion therapy, where 'word' is used as conditioned stimulus and as a psychotherapeutic factor. Thus non-Pavlovian psychiatrists tend to concentrate on the symptoms of the disease, the disturbed behavior, thought and speech of patients, Pavlov concentrates on the nervous system disturbances underlying and giving rise to the symptoms.

5. Why we do work with the Pavlov 'school' ?

A: We are providing services to our people on mental health and neurosciences. Pavlovian new science is by no means a finished product, but there are already sufficient facts, and generalizations based on them, to make a convincing case. It is the contention of the Pavlov 'school' that to become fully experimental, psychology and psychiatry must be firmly rooted in the physiology of the brain. Especially in view of the critical problem of mental illness in our country, it is encumbrance on us to investigate all relevant scientific claims.

6. What is Pavlov's teachings?

A: Brain, as the apex of the nervous system, regulates the internal environment of the body by maintaining a dynamic equilibrium. Moreover brain establishes and regulates the relationship between the body and the external environment.

7. What is the significance of Pavlov's teachings?

A: Pavlov stands for the the objective, experimental method to study the human mind and the opposite is subjective, introspective method. Human nature is not only 'consciousness', it includes motivation, emotion, intelligence, judgement, cognition, memory etc.. So if we want

to study it by only our conscious introspection then it would be only some speculative idealist thoughts not science. Then if we base our psychology and psychiatry on this subject thoughts it would be very much injurious to the people. There is no shortcut way to know mind except doing hard, rigorous, researches on nervous system of the body.

8. What is the contribution of Pavlov in science?

A: The concept of conditioned reflexes as dealing with signals of external objects is one of the richest theoretical contributions ever made to science. It put animal psychology on a sound scientific basis, making it forever inexcusable to read human subjective interpretations into animal activity. Pavlov's cardinal thesis is the Darwinian principle of the interaction of the organism and the environment. One problem with this principle had always been an implication of pre-determinism through inborn instinctive control of behaviour.

9. Whom Pavlov considered as his great teachers?

A: Charles Darwin, Claude Bernard, I. M. Sechenov and T. Tson.

10. Who have started Pavlov 'school' in Asia?

A: Dr. Dhirendranath Gangopadhyay in Kolkata around 1955, at his Shyambazar's residence.

P A S

Dr. Dhirendranath Gangopadhyay Memorial Lecture, 2006

Speaker : Dr. Ramakrishna Bhattacharya

Title of the lecture : Why Utopias Do Not Die

Language : Bengali

Entry : Open

Date : 23 December 2006

Time : 4 p.m.

Venue : Darbhanga Hall, Calcutta University

Abstract

The history of utopias did not originate with the famous book of the same title (1516) by Thomas More. Even before that, not only in ancient Europe, but in ancient India too, we find imaginary pictures of various kinds of happy societies. In the *Aitareya Bráhmaṇa*, this country is called Uttarkuru, situated near the North Pole. This country has been repeatedly mentioned in the *Ramayana*, *Mahabharata*, *Matsya Purana* and *Dirghanikáya*. In that country, there is no quarrel, no such thing as private property; there women enjoy the same rights as men do. In none of these works has Uttarkuru been shown as a dream world belonging to a distant past. It is as though that country is still extant; only, no outsider is allowed to enter it.

In many countries of the world, we also find another idea called Eudromia, which imagines a happy age. That age, however, has ended. It belongs to a past of which the present bears no trace, nor is there any possibility of its regeneration. Behind the notion of the eudromia, there is a cynical outlook. It sees human history as a gradual deterioration. Satyajug is followed by Treta and Dwapar, and finally by Kaliyug. The picture is that of the same cynicism. In a way, the Golden Age and the Silver Age et cetera of classical literature also fit into the same category. The Indians did envision a rebirth of Satyajug after Kaliyug, but

even that was transitory; after it, treta and dwapar reappeared.

However, Uttarakuru never fell victim to such degeneration. Whatever might have taken place in other parts of the country; there the happy society remained intact, immune against every contagion – the same as happened in More's Utopia.

The nineteenth century utopian socialists tried to build up exclusive colonies on that model in various locations. They thought, driven by their example people in other parts of the world too would try to establish similar happy and egalitarian societies. Of course, that did not happen; on the contrary, their colonies soon died down.

Yet, it must be noted that the utopian socialists were not content with merely contemplating an alternative social system; they actually tried to make it a reality. That is why, for Engels, such utopian socialists as Saint-Simon, Fourier and Owen are not objects of ridicule, but worthy men who gave shape to theories of state.

The socialism that Marx and Engels talked of did not drop into their heads automatically. They had indeed assimilated much from syndicalism and utopian socialist thought. The main difference lay in a particular point. Instead of experimenting in an isolated quarter, they envisaged a world system that was futuristic, vibrant and mobile. Yet, even that system would not take an ideal shape from the very beginning. One would have to advance towards such an ideal system through continual changes. Marx and Engels had not envisioned something born-immaculate like Uttarkuru or Utopia.

If one confines oneself only to the past and the present, one can never dream about a truly happy society. One has to look to the future. Future means an infinite and boundless extension of time. As long as human language allows of the possibility of forming if-sentences, and grammar provides for the future tense of verbs, there is no reason to lose hope. Human progress over a few thousands of years has been achieved by realising many apparently absurd ideas. One simply cannot obliterate the idea of a happy society. Based on that, it can well be said that one must look to the future and cherish the dream of a happy society.

P A S

A lonely pine is standing
 In the North where
 high winds blow.
 He sleeps, and the
 whitest blanket
 wraps him in ice and snow.

He dreams – dreams of
 a palm – tree
 that far in an Orient land
 Languishes, lonely and drooping,
 Upon the burning sand.

– Heinrich Heine.